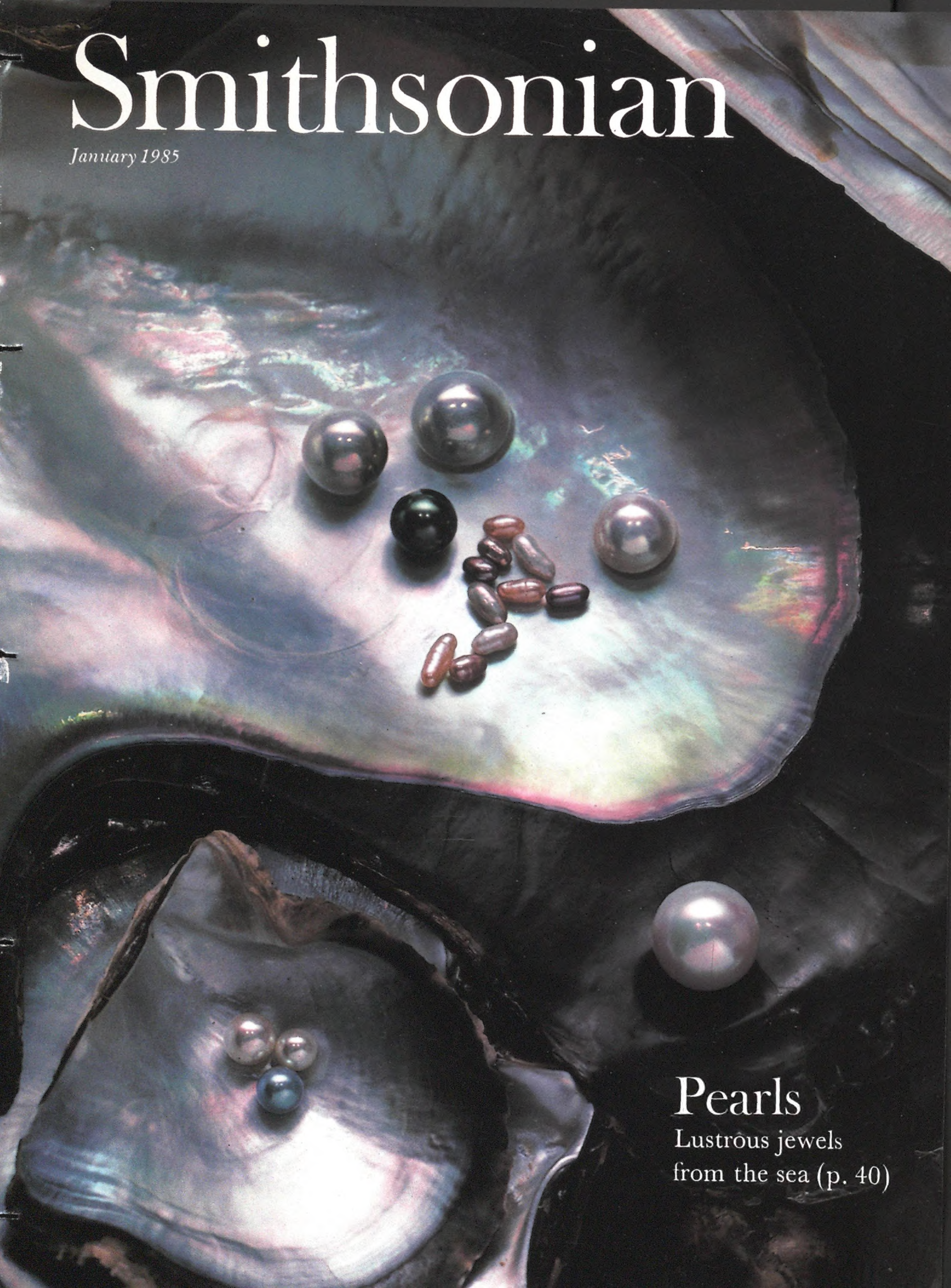
Smithsonian

January 1985



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from the sea (p. 40)

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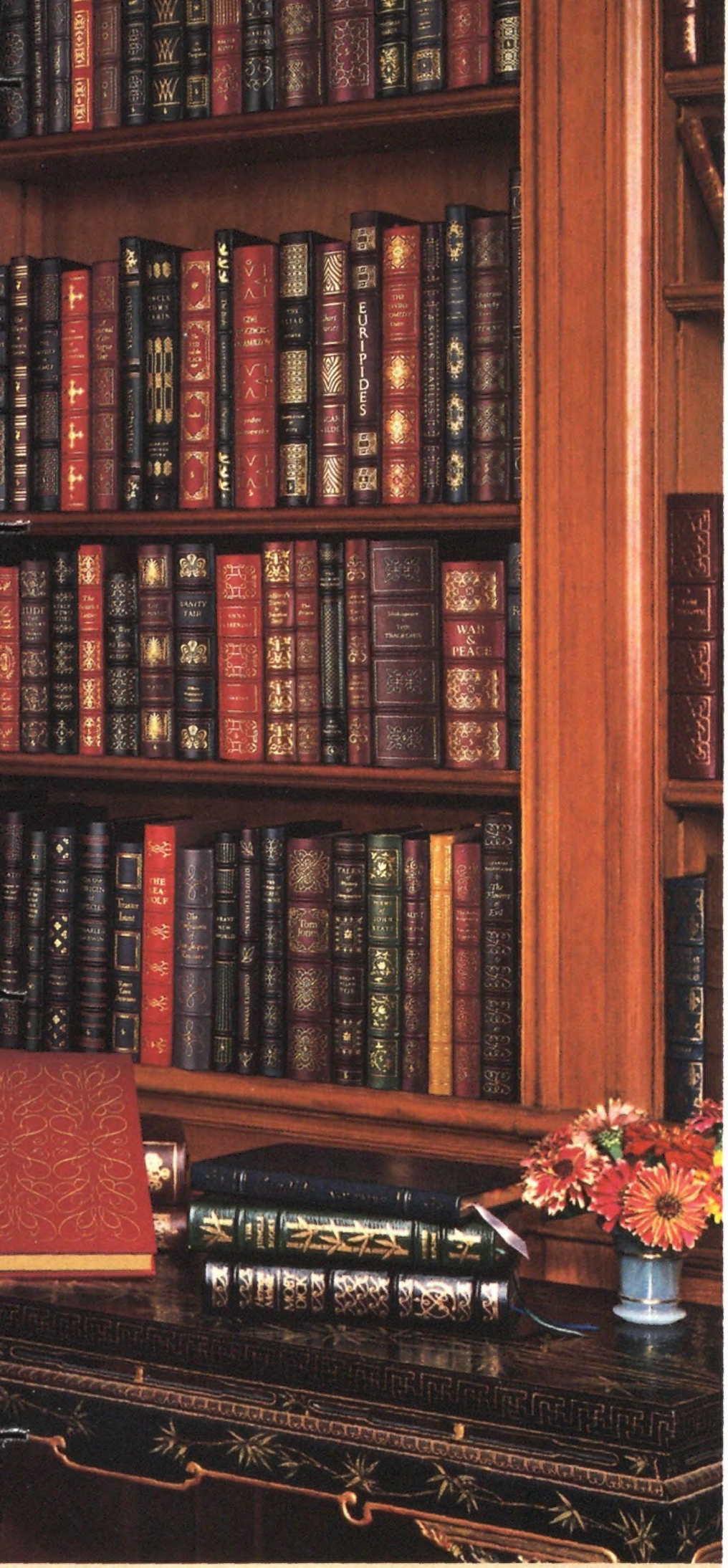

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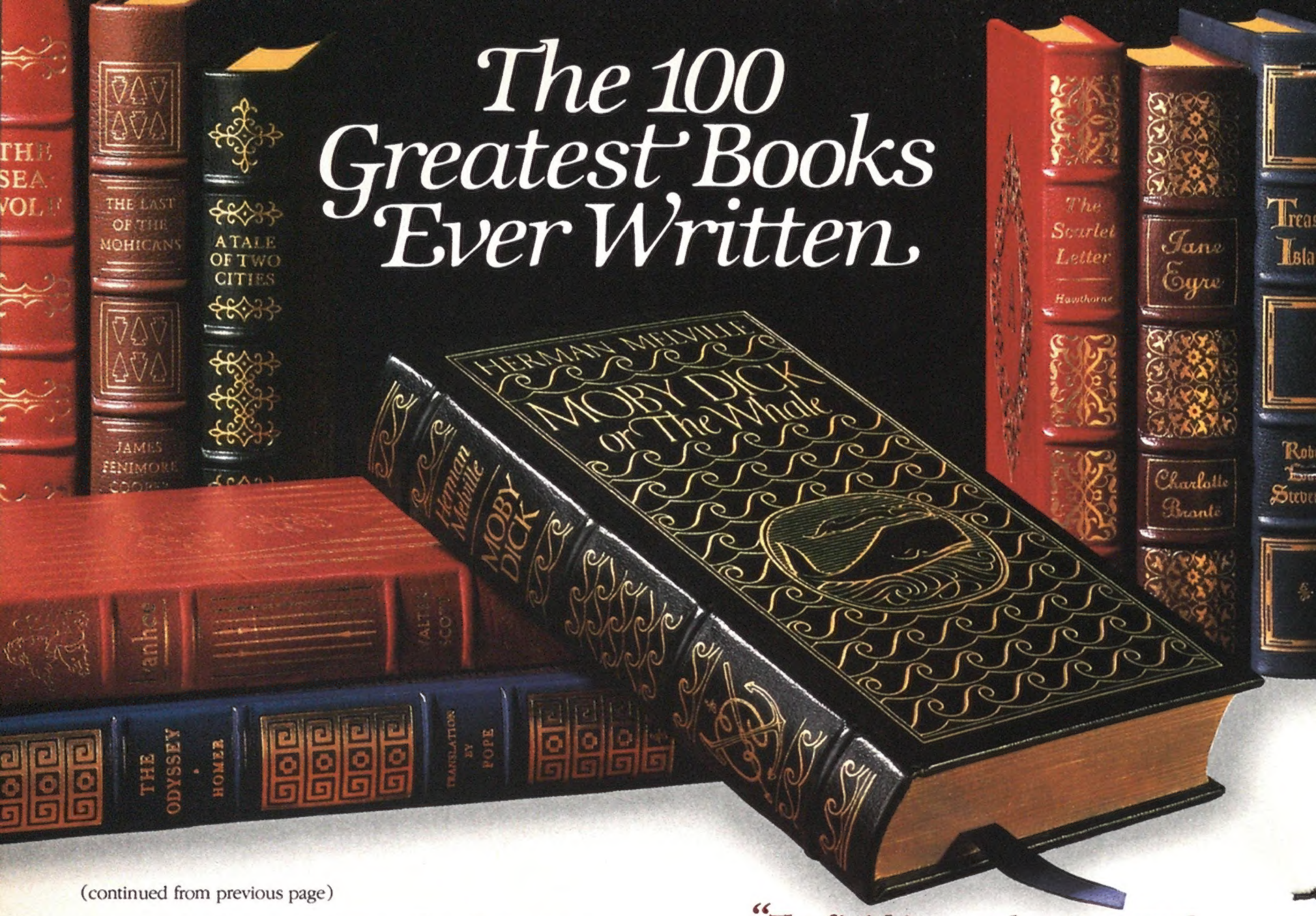

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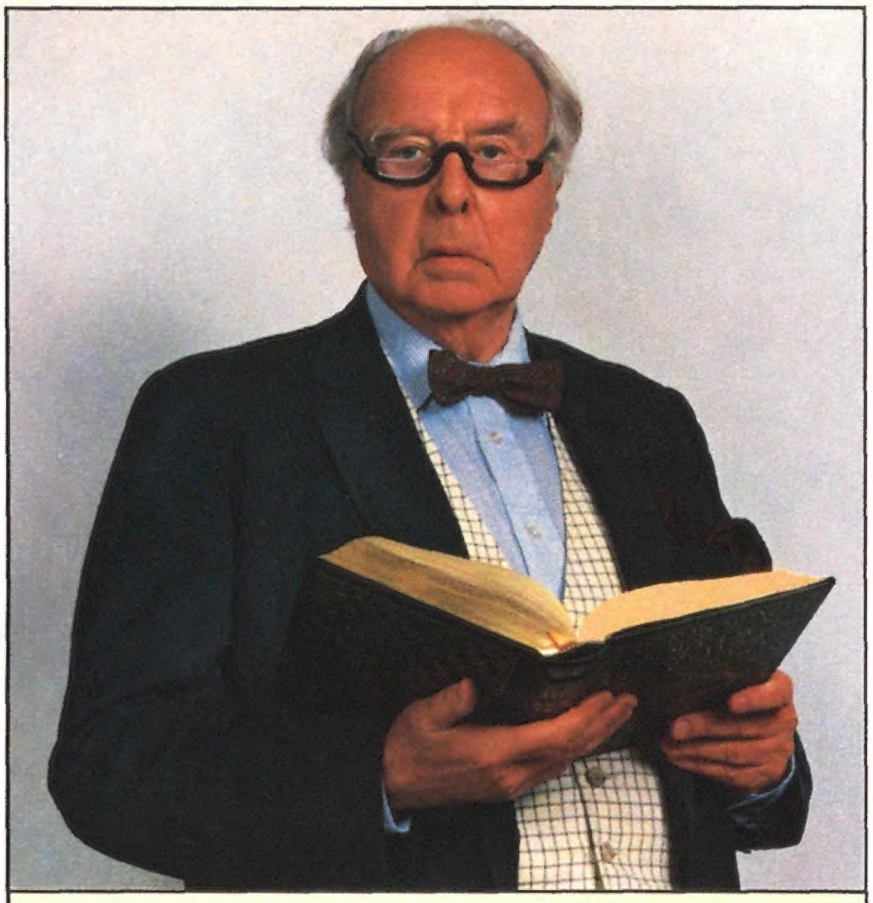

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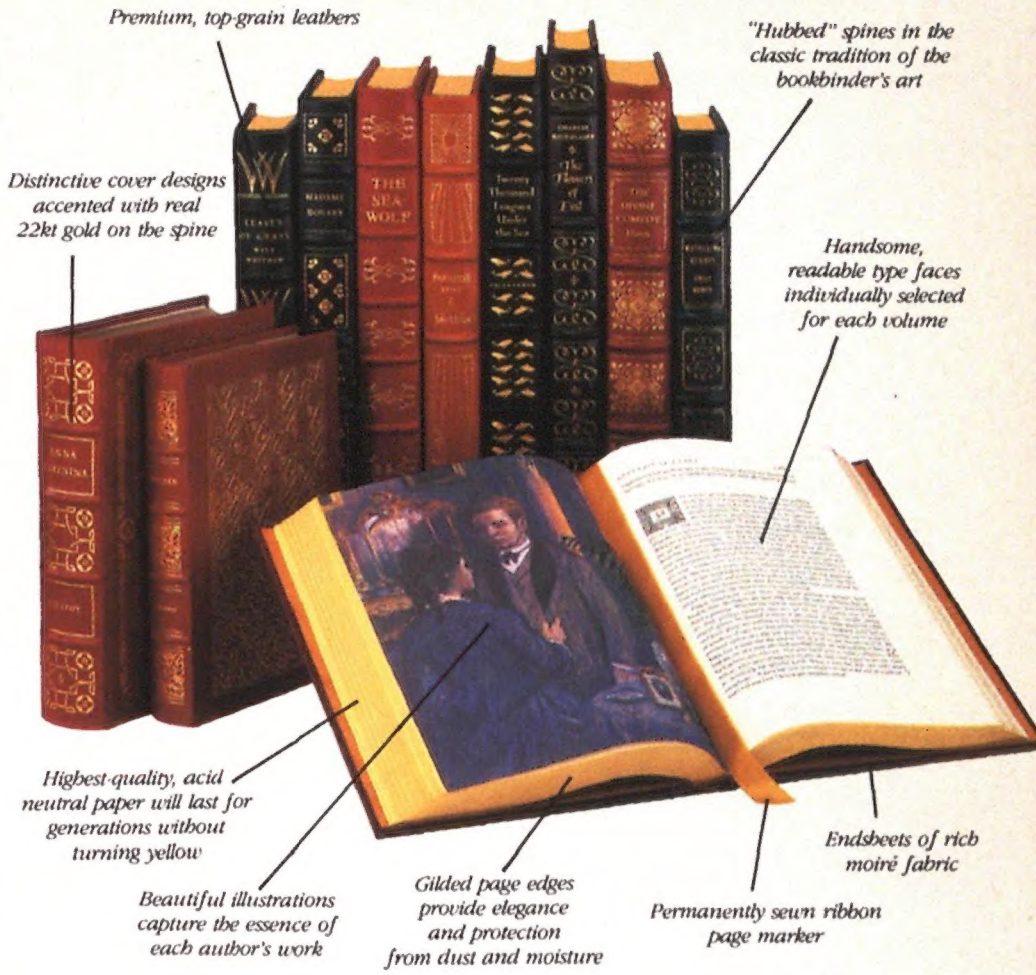
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January 1985

Smithsonian

Volume 15, Number 10

Table of Contents

Cover: Round cultured pearls from salt water, irregular ones from fresh water, are displayed on the half shell (p. 40)
Photograph by Michael Freeman

10 *Smithsonian horizons* by Secretary Adams
14 *Letters to the Editor*
20 *Around the Mall and beyond* by Edwards Park
26 *Picture credits*
30 *Phenomena, comment and notes* by John P. Wiley jr.

40 **The queen of gems comes back**
Pearls fell on hard times during the 1960s, but today they are more popular than ever
By Nigel Sitwell, photographs by Michael Freeman

54 **The greatest soldier in Europe**
Prince Eugene of Savoy was snubbed by Louis XIV, who lived to regret that error in judgment
By Robert Wernick, photographs by Erich Lessing

66 **Pieces of a global jigsaw puzzle**
The continents are crazy quilts of fragments coming from widely scattered parts of the Earth
By Walter Sullivan, illustrations by Laszlo Kubinyi

78 **Minnesota's wolves spark a controversy**
The last large timber wolf population in the lower 48 states is protected by law, but many people object
By David Nevin

90 **HPV stands for human-powered vehicles**
Bicycles or tricycles with aerodynamic shells, the only thing they have in common is pedals
By Thomas A. Bass, photographs by Martha Cooper

102 **'Greatest' air-war pictures are shot down**
Two sleuths at NASM add a dramatic climax to the saga of famous photographs from World War I
By Edwards Park

114 **Tropical butterflies in a London 'jungle'**
Lepidopterist Clive Farrell opened his Butterfly House in 1981; now one is planned for New York
By Timothy Green; photographs by Geoff Tompkinson

122 **Why do indoorsy people want to look outdoorsy?**
Whatever the reason, camping and hunting clothes have now become an urban fashion phenomenon
By Richard Wolkomir, illustrations by Lane Yerkes

138 *Book reviews*
144 *Additional reading*
146 *January events at the Smithsonian*
150 *Smithsonian tours*

152 **'What are we having for little lunch?'**
By Rudolph Chelminski

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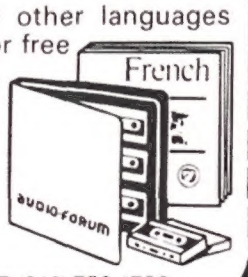

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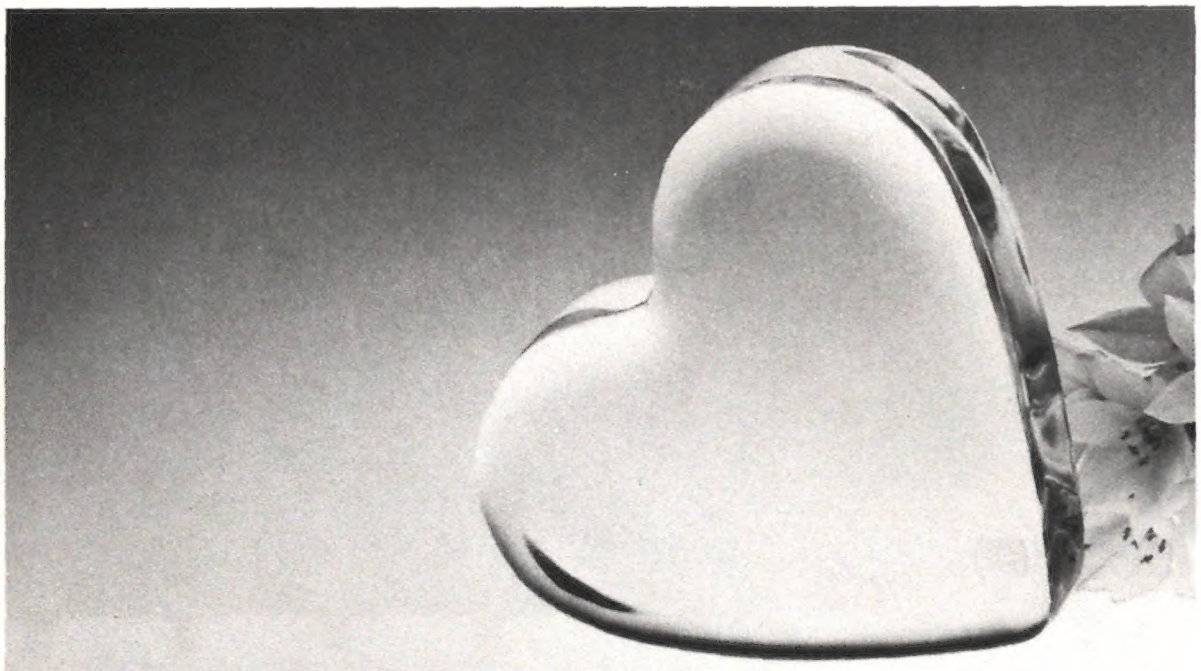

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Smithsonian horizons

Objects do not exist in isolation: they have contexts, and the museum exhibit is a valuable way of setting them forth

There is something of the collector in all of us. Carpets were, as an outgrowth of doing fieldwork in the Middle East, my natural point of departure. Later, my wife and I eclectically added a sprinkling of Chinese snuff bottles and blue-and-white porcelain. Our acquisitive instincts are for the moment in arrest, except that really settling in Washington will involve not only becoming familiar with its bewildering arrangements for one-way traffic, but also tapping into new distribution networks for auction catalogs. We are, in short, only garden-variety collectors.

Still, there are intense moments of vicarious pleasure in seeing the real thing at work. Dr. Arthur M. Sackler, whose magnificent collection of Oriental art will be a centerpiece of our new Quadrangle, is surely one of the all-time great collectors. Interviewed by David McCullough on a recent *Smithsonian World* television program, he eloquently communicated the "passionate hunt" that this had involved for him. And the outcome, he argued with conviction, was "a revelation, an insight . . . a group of objects which when put together are more than the sum total of their parts."

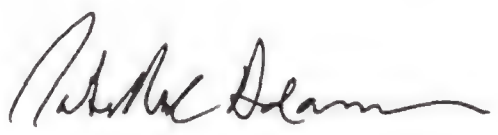
In other words, objects have contexts. As an archaeologist, I feel strongly that the first and most important kind of context is that of their immediate time and place of use—as provided, for example, by scientific excavations. Beyond that, as Sackler suggests, objects form ensembles. They hint at underlying unities of stylization, conception or origin.

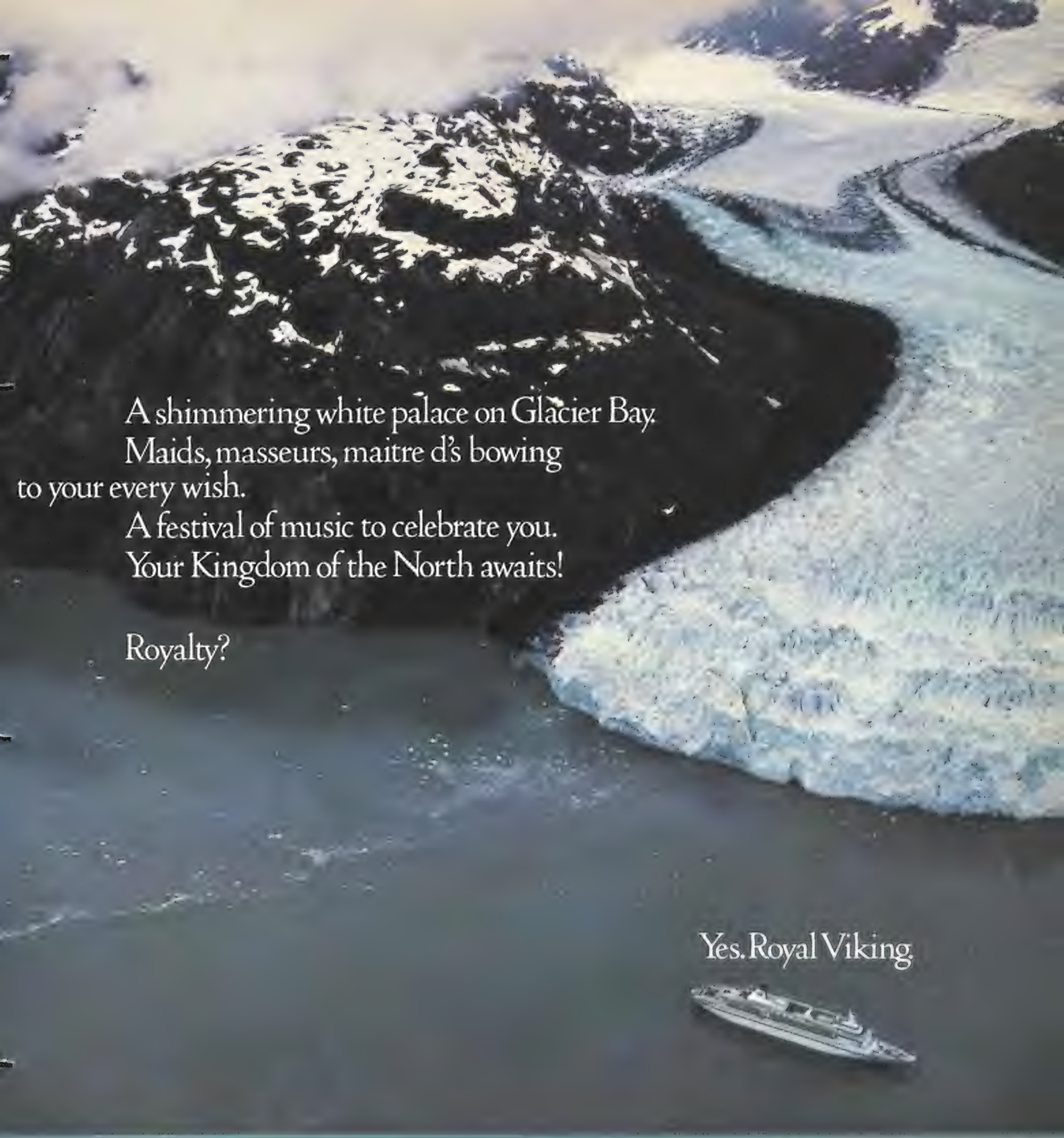
Museums are collections writ large. A few of the objects in their storerooms may command full attention in their own right. But the real value of most objects derives from the places they occupy in collections. The responsibility of the curator is to relate them to one another in ways that will generate new sensitivities or ideas for visitors to carry away.

French historian Paul Veyne says in *Writing History*: "The 'museum piece' is a complex notion bringing together beauty, authenticity, and rarity; neither an aesthete, nor an archaeologist, nor a collector will in his raw state make a good curator." It is also a relativistic notion. The art historian's poor copy or the museum registrar's disposable duplicate is perhaps the social or technological historian's crucial evidence of the nature of the family group or the organization of ancient production.

Coming from a university background, I have tended to think of the published book or scientific article as the primary vehicle for the dissemination of knowledge. But as a means for sustaining and deepening the notion of context, the museum exhibit is surely no less important. It is probably also better at suggesting the relationship between design and materials, or the many common strands of symbolic representation that run through humankind's entire cultural record. More effectively and perhaps more widely than the printed word, the exhibit communicates the riches of the museum collections from which it is drawn.

We need both forms of dissemination, of course. We need collections-oriented curators and curators concentrating on questions at more abstract or analytical levels, for which the objects themselves provide only indirect clues. Not only the diffusion but the increase of knowledge, in the Smithsonian setting, has to include both.

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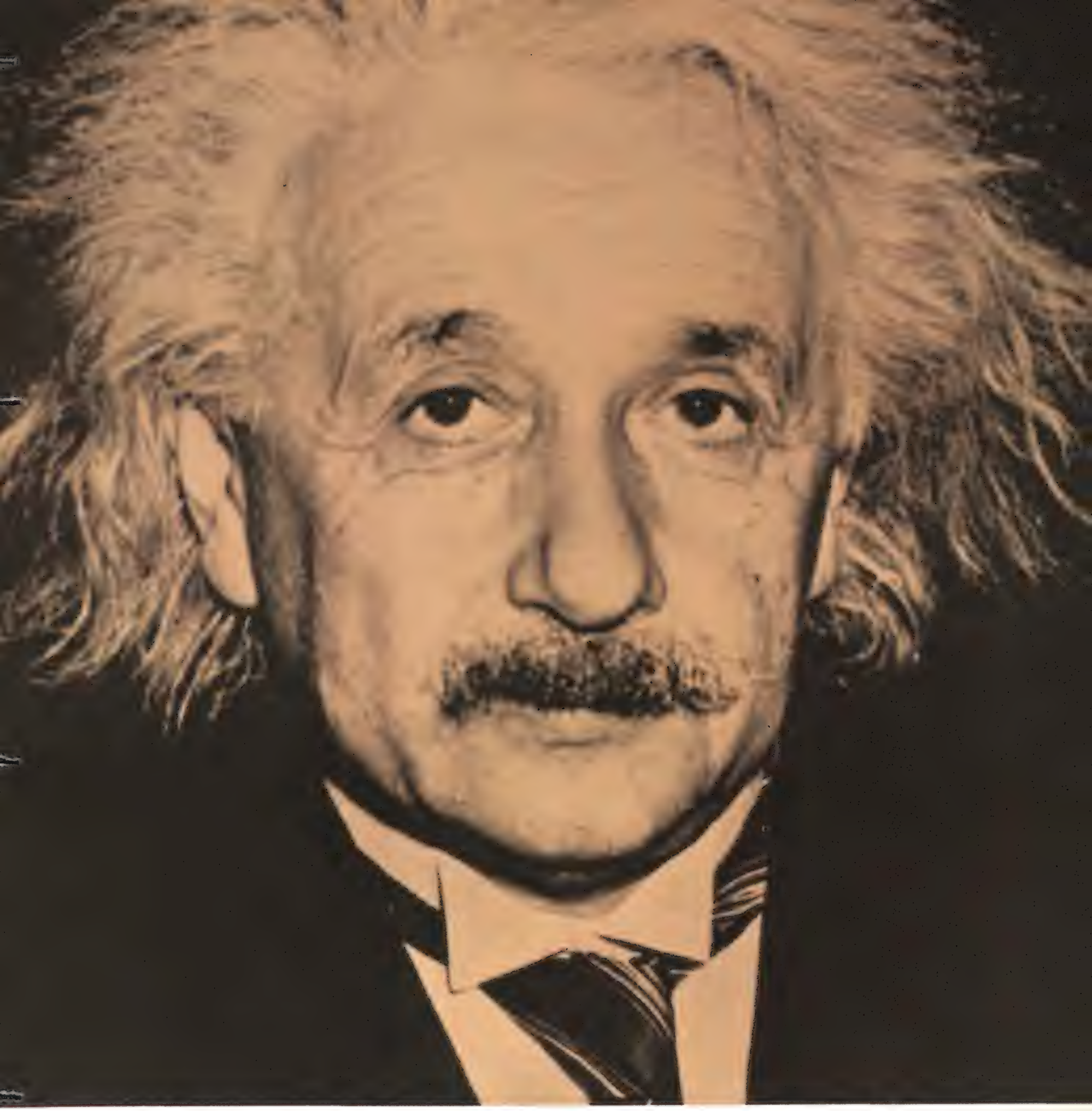

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Letters to the Editor

Albertina Collection

Dear Sir: Apropos of John Canaday's November article, the more colorful offerings of oil, water and other paint media have bedazzled many into missing the straightforward elegance often found in the dichromatic lines of a drawing or sketch. How very close they bring us to the artist!

The task of drawing holds as unique a place in the evolution of a work as do drafts, blueprints and foundations to three-dimensional structures—they are the link that cannot be missed by any artist who wants to refine a concept from within. With Dürer's study of hands and Rembrandt's elephant we see the "cryptanalytic" side of the artist at work as he endeavors to unlock the secrets of light, shadow and form prior to adding the further dimension of color. It is nice to be brought back to the black and white of it all.

Jim L. Lloyd
Terre Haute, Indiana

Falconry

Dear Sir: As a member of the National Audubon Society and the National Wildlife Federation as well as a member of the Smithsonian Associates, I am very distressed that you saw fit to publish an article glorifying and romanticizing the grisly, cruel and inhumane practice of falconry.

There is no sport whatsoever in setting one animal loose to maim or kill another. In addition to the cruelty involved, the falconers are putting excessive pressure on endangered species.

While I do appreciate your editorial reminder that "it is essential to remember how important protection is," my reaction to the portrayal of a blood sport as an acceptable and enjoyable activity is extremely negative.

Jane Lockwood
Cheswick, Pennsylvania

Dear Sir: It was appalling to open the most recent issue of the magazine and find an article about falconry. It is reprehensible to publicize and highlight in any way this egregious activity and exploitation of protected birds.

Ellen D. Pattin
Olney, Maryland

Dear Sir: Your article was a deep pleasure for this bird-watcher. As to the photograph captioned ". . . falconer relaxed, dog alert and bird of prey apparently bemused"—what a lesson in compatibility!

Helen E. Mackintosh
Garden City, New York

George Ablah

Dear Sir: The name of the church where Mr. Ablah saw Michelangelo's *Moses* is S. Pietro in Vincoli.

Rita McPherson
Hingham, Massachusetts

Dear Sir: New York has been the Mecca of the art world long enough. Kansas, and the Midwest in general, have existed as the butt of jokes about a cultural wasteland. So I believe I speak for many people from the Sunflower State when I express my disappointment in George Ablah's decision to lend New York City 26 of his Henry Moore sculptures.

If Mr. Ablah wants to share his passion for art with others fairly, why doesn't he do so in his home state? A man of his ability and resources would have no difficulty in establishing a major sculpture park in Kansas. Such a move would be a step in bringing the central states into the limelight as legitimate environments for the display of art.

John D. Van Sickel
St. Louis, Missouri

Beavers

Dear Sir: No matter what species, the pattern seems similar. Man exploits and frequently brings the species to near-extinction, without understanding, compassion or reason. Wildlife management's "harvesting" is simply slaughter of a percentage of the species.

Why is destruction our only solution to real or imagined problems concerning other species?

Jean Lauren
Philadelphia

Dear Sir: Your story doesn't do these architectural geniuses justice. Sure they cause some environmental problems. But look at the concepts they've pioneered. Do beavers get enough credit? A Charles Addams cartoon in *The New Yorker* [below] had the right answer: not by a dam site.

B. Pollock
New York City

"I didn't actually build it, but it was based on my idea."
© 1984 *The New Yorker*

Dear Sir: Doug Hand missed mentioning the unique aspect of the transplanting program in Rock Springs, Wyoming. The transplant sites are streams in now-treeless areas. Work crews provide freshly cut trees from nearby forest-thinning projects and the beavers immediately use them in constructing their famous erosion-control systems.

Barb Gorges
Miles City, Montana

Dear Sir: While not necessarily beguiling to everyone, the beaver must be admired for its work habits and dedication to labor and to family.

How a Kansas farm girl became a maven on Peruvian alpaca fashions

The alpaca, cousin to a llama, lives at the 15,000-foot level in the Peruvian Andes. It is an unpleasant beast that spits at people.

But its wool is magnificent. To survive the Peruvian winter, the alpaca grows a tremendously thick coat. So it won't weigh down the animal, the wool has hollow hair shafts. So it won't get wet and matted, the wool has a high lanolin content. Result: alpaca wool is deceptively lightweight, with a deep and silky softness to the touch. Many who have compared them maintain that alpaca is richer than cashmere.

These facts and more are related by Annie Hurlbut, a farm girl from Tonganoxie, Kansas who went to Yale, became an anthropologist, then traveled to Peru to pursue her profession.

This is not Annie Hurlbut. This is another Kansas farm girl who traveled to faraway places.

In Peru she studied "market women" in remote Andean villages. These women practice a centuries-old tradition that predates even the Inca empire: they weave alpaca wool into clothing (historically, ponchos and capes, but today, mostly sweaters).

By U.S. standards, Annie Hurlbut found the styling unsophisticated, but the sweaters had a peasant-like verve and freshness that made a perfect counterpoint to the luxury of the fabric.

This is not Annie Hurlbut. This is a model wearing Annie's gray mufflered cape (100% alpaca, of course), $165 plus $3.75 s&h.

So Annie Hurlbut did what any Kansas farm girl would have done. She restyled the sweaters, set up sources of supply, went back to Tonganoxie and with her mother, Biddy, started a mail order business.

Eight years and 34 buying trips later, their business ("The Peruvian Connection") publishes a 36-page full-color catalog with 172 items.

There are sweaters, skirts, camisoles, capes, blankets, ponchos, mufflers—even tapestries.

This is an alpaca. Its wool has hollow hair shafts and a high lanolin content. It may well be the lightest, softest, most luxurious wool fiber in the world.

Everything in the catalog is made in Peru of native materials. Most designs are original (many are Annie's) and most items are exclusive.

It is the largest selection of its kind in the U.S.

It's a fun catalog to shop. Alpaca wool grows naturally in many colors, from white to beige, brown and gray. It also takes dye quite well, so you'll find not only the earth tones, but also marvelous shades of raisin, periwinkle, peach, sage green and teal blue.

And you'll find breathtaking pictures of the Peruvian highlands, because Annie Hurlbut loves Peru and the Andes mountains.

This is Annie Hurlbut. She is wearing her native Andean padre hat of embroidered wool felt (black, teal blue or taupe), $35 plus $2.90 s&h. (For proper size, measure around head.)

The best part: the catalog is free, as long as supplies last. You can mail the coupon or phone toll-free for a copy.

Annie thinks she's reserved enough catalogs to cover requests from this ad, but it wouldn't hurt to be prompt with *your* request, just in case.

the peruvian connection®
Canaan Farm S185 Tonganoxie, KS 66086

Mail coupon or phone toll-free: 1-800-255-6429

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City _____ State/Zip _____

S185

I had the distinct pleasure of meeting Chopper, the beaver raised by Mrs. Hope Sawyer Buyukmihci at the Unexpected Wildlife Refuge. It was a bit startling to find a beaver-wading tub and enclosure with exit tunnel in the middle of the living room. However, it was spine-tingling to touch Chopper's coarse outer fur and to feel his soft, delicate hands on mine as he reached for a piece of apple, trilling that strange vocal accompaniment.

There are many projects wisely using beavers to restore otherwise desolate, "used up" places where people need good clean water and animals need a restored habitat. Would that more people could appreciate the beavers' conservation of the Earth's resources instead of seeing them only as desirable pelts or destroyers of property. I hope we can all learn, as I did from Chopper, that it is their world, too, and *they* are conserving it.
Joan Scavelli
Annandale, Virginia

Covarrubias

Dear Sir: A few days after reading your article I was going through old files of my late father's publishing firm, Albert & Charles Boni, and came across their 1930 catalog. It announced *Frankie and Johnny* by John Huston, illustrated by Miguel Covarrubias, and the promotional text stated that the characters in Mr. Huston's play "are given the vital spark so typical of Covarrubias' work." There was also a picture postcard of two Indonesian maidens with the message: "Dear Albert: I heard 'Frankie and Johnie' [sic] was a big success! but I have never seen it yet! will you send me some copies at 51 Quai Bourbon, c/o Marc Chadourne, Paris? Having a swell time in Sumatra after Japan, China, Philippines, Celebes, Borneo, Bali and Java, but will be in Paris this spring. Best regards to you and Charles. Miguel."

And in our dining room hangs a framed cartoon of Charlie Chaplin, complete with derby and cane. It is signed "Covarrubias."
William F. Boni
Carmel, New York

Dear Sir: I remember most of those classic caricatures from the great days of *Vanity Fair*, and from *The Prince of Wales and Other Famous Americans*, with its preface by Carl Van Vechten. The dandified Prince, John D.'s wrinkles, Will Rogers, Eddie Cantor, Gish and Pickford are unforgettable. And none more so for me, than Woollcott, a dead ringer for the editor under whom I worked through three decades. The closing touch—the artist's caricature of himself as the innocent "murderer."

And then there was the *Frankie and Johnny* collection, whose illustrations so perfectly reflected, and spoofed, the bawdy days of a century ago.
Allen M. Oakley
Quincy, Illinois

McGuffey Readers

Dear Sir: William Holmes McGuffey was like another member of our family. As long as I can remember, my parents, John F. and Easter Carlisle, talked, read and promoted the McGuffey Readers. An entry in my mother's diary dated March 23, 1918: "The McGuffey Reading Club was organized at a meeting held at the Franklin County Court House. . . . Papa [my father] was made President." The McGuffeyites met monthly and each March a banquet with speakers and entertainment honored McGuffey.

Dean Minnick of Miami University and my father, founder of the McGuffey Society of America, were instrumental in arranging for a statue honoring McGuffey on the university campus.
Jennette Carlisle Smith
Columbus, Ohio

Speeding the Weed Route

Dear Sir: As one who spent his youth in Deadwood, South Dakota, James Traub's article brought back fond memories. One of my best-loved pastimes was sneaking a ride on slow-moving switch engines in the CB&Q yards. In addition to the electric trolley to Lead there was the Chicago and North Western narrow-gauge dinkey to Lead via Central. I loved to board it and ride for a few blocks while it switched tracks.

You wrote about an era dear to my heart: the golden years from 1907 to 1916.
Chuck Carr
Palo Alto, California

O Esso, Esso . . .

Dear Sir: An old legend in the tiny Sudanese town of Kodok tells of George Eastman posing for a photograph atop a monument bearing the name of the town.

When asked why he had been trespassing on the monument, he replied that he had thought it might be amusing to have a picture of himself under a sign "Kodok" holding his "Kodak."
S. J. Atwood
Harrisburg, Pennsylvania

Dear Sir: One wonders how, after the phenomenal sums spent on devising product names, Chevrolet came up with the Nova. In Puerto Rico or any other Spanish-speaking country, a Nova that *no va* [does not go] could be a sales disaster.
Carolyn A. Quadarella
Silver Spring, Maryland

Dear Sir: Richard Wolkomir's essay recalled a punny little story that passed my way: A Japanese automaker had a new line of compacts about to roll off the assembly line—and no name for them. Realizing how much the proper dubbing can mean in the marketplace, he went to Germany and sought out the adman who gave that country's phenomenally successful "people's car" its name.

"You came up with 'Volkswagen' for Germany," said the automaker. "What can you do for me?"

"When will your cars be on the sales floor?" asked the German. "In ten days," replied the Japanese.

The adman, surprised by being given so little time, said "Dot soon?"
Mark Anthony
Lubbock, Texas

Honest Associates

Dear Sir: DON'T LEAVE HOME WITHOUT IT! An astonishing incident occurred in a shop in the neighboring city of Salem, Oregon, recently. I planned to pay for my purchases by personal check, and while I was fumbling through my wallet, the salesperson spied my Smithsonian card. "Oh, that's identification enough," she said. "Nobody who carries a Smithsonian card would ever give a bad check!"
Ann Rohner
Newport, Oregon

Olds Delta 88.

"This is the family car that didn't forget the family."

Dick Van Patten

"Most so-called family cars are too cramped for a big family like ours.

"Not our Delta 88. It carries six, so even our three sons can stretch out. And they're each over six feet tall.

"The trunk is huge! You can stow a big family's luggage in there. Perfect for a trip.

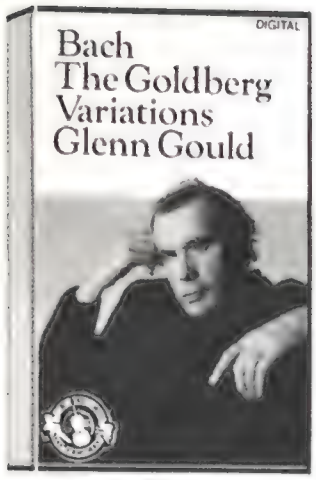
"Plenty of luxury too—like full-foam seats. And elegant styling that makes a family feel proud.

"One final thing—Olds engineering. You can't see it, but you sure can *feel* it! That's why I first started driving an Oldsmobile back in 1947."

There is a special feel in an Oldsmobile

Let's get it together... buckle up.

THE CLASSICS



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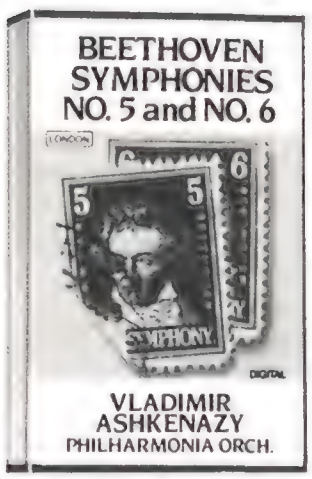

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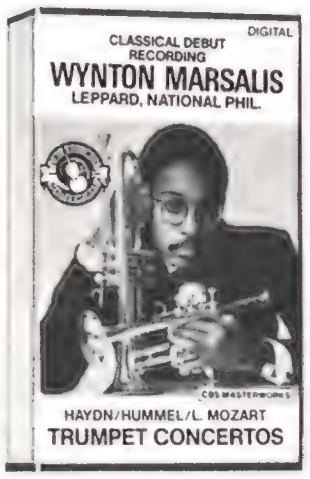

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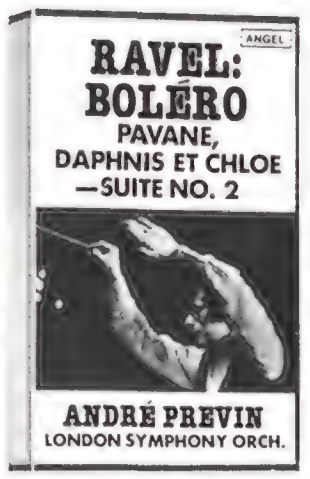

318451

326553

BACH

326983. Bach: Organ Masterpieces—*Toccata & Fugue in D Minor,* etc. Anthony Newman (Sine Qua Non)

171504. Switched-On-Bach—Moog versions of *Air on a G String; Wachet Auf;* etc.—played by Wendy Carlos (Columbia)

319434. Bach: Sonatas for Viola De Gamba and Harpsichord—Yo-Yo Ma, cello; Ken Cooper, harpsichord *(Digital*—CBS Masterworks)

306464. Little Bach Book—Glenn Gould plays favorites from *French Suite;* many more (Columbia)

316216. Bach: Suite No. 2 for Flute; Telemann: Flute Suite in A Minor—J. Baker, A. Newman, Madeira Festival *(Digital*—Vox Cum Laude)

328054. Bach's Tops—*Gavotte; Sleepers Awake;* more. Kapp, Philharmonia Virtuosi of New York (CBS)

BEETHOVEN

273409. Beethoven: 3 Piano Sonatas—(Moonlight, Appassionata, Pathetique) Horowitz, piano (Columbia)

326918. Beethoven: Piano Sonatas No. 3 & 23 (Appassionata)—beautifully played. Andre-Michel Schub *(Digital*—Vox Cum Laude)

325340. Beethoven: "Hammerklavier" Sonata; 11 Bagatelles—Rudolf Serkin (Masterworks Portrait)

322362. Beethoven: Piano Trios No. 1 & 3—three virtuosi: Barenboim, DuPre, Zukerman (Vox Cum Laude)

315457. Beethoven: Symphony No. 3 (Eroica)—Szell, Cleveland Orch. (CBS Great Performances)

252874. Beethoven: Symphony No. 9 (Choral)—Ormandy and the Philadelphia Orch. (Columbia)

325654-395657. Beethoven: Piano Concertos No. 1 & 5 (Emperor)—Brendel, piano; Mehta and Boettcher, cond. (Counts as 2—Vox)

230425. Beethoven: Violin Concerto—Isaac Stern; Bernstein, New York Phil. (Columbia)

173674. Beethoven's Greatest Hits—*Ode to Joy;* excerpt from *Moonlight Sonata;* etc. Various artists (Columbia)

BRAHMS

307884. Brahms: Double Concerto—Zukerman, Harrell; Mehta, New York Philharmonic (Columbia)

328039. Brahms: Symphony No. 3; Haydn Variations—Mehta, New York Phil. (CBS Masterworks)

329110. Brahms/Schoenberg: Piano Quartet—a masterful transcription! Comissiona, Baltimore Sym. *(Digital*—Vox Cum Laude)

312439. Brahms: Liebeslieder Walzer; Neue Liebeslieder Walzer (complete)—L.A. Vocal Arts Ensemble *(Digital*—Nonesuch)

CHOPIN

246843. Chopin: Mazurkas, Etudes, etc.—Vladimir Horowitz, piano (Columbia)

306183. Chopin: Piano Concerto No. 1—Murray Perahia; Zubin Mehta and NY. Phil. (Columbia)

DEBUSSY

322826. Debussy: La Mer; Nocturnes—Michael Tilson Thomas, Philharmonia Orch. *(Digital*—CBS Masterworks)

328005. Debussy: Images (complete); **Estampes;** etc.—Ivan Moravec, pianist *(Digital*—Vox Cum Laude)

296830. Debussy: Quartet; Ravel: Quartet—Tokyo String Quartet (Columbia)

328401. Debussy: Sonata for Flute, Viola and Harp; Syrinx for Solo Flute—plus works by Ravel, Faure, etc. Orpheus Trio *(Digital*—Vanguard Audiophile)

191874. Debussy's Greatest Hits—*Clair de lune, Reverie,* etc. Bernstein, Ormandy, etc. (Columbia)

GERSHWIN

318295. Gershwin Live!—Sarah Vaughan sings *The Man I Love,* etc. Thomas, Los Angeles Phil. (CBS)

321471. Gershwin: Piano Concerto in F; An American in Paris; Rhapsody in Blue—Andre Previn and the London Symphony (Angel)

HAYDN

326561. Haydn: 3 Favorite Concertos—Cello in D (Yo-Yo Ma); *Violin in C* (Cho-Liang Lin); Trumpet in E Flat (Wynton Marsalis (CBS Masterworks)

257956. Haydn: Symphonies No. 101 (Clock) and **No. 103** (Drum Roll)—Bernstein, New York Phil. (Columbia)

MAHLER

314369. Mahler: Symphony No. 1 (Titan)—Maazel, Orch. Nat'l de France (CBS Masterworks)

317685. Mahler: Symphony No. 4—Ameling; Previn, Pittsburgh Sym. (Angel)

325357. Mahler: Das Lied von der Erde—soloists, NY. Phil., Bruno Walter (Masterworks Portrait)

MOZART

294264. Mozart: Piano Concerto No. 21 (Elvira Madigan) and **No. 17**—Ashkenazy plays, conducts Philharmonia Orch. (London)

325365. Mozart: Eine Kleine Nachtmusik; Symph. No. 40—Casals, Marlboro (Masterworks Portrait)

318311. Mozart: Symphonies 36 (Linz) **38** (Prague)—Rampal, Mostly Mozart Orch. (CBS Masterworks)

314955. Mozart: Symphonies No. 40 & 41 (Jupiter)—Szell, Cleveland Orch. (CBS Great Performances)

326975. Mozart: Violin Concerto No. 4; Adagio; Rondos—Zukerman plays, conducts St. Paul Chamber Orch. (CBS Masterworks)

SCHUBERT

322487. Schubert: "Death and the Maiden"; "Quartettsatz"—Tokyo String Quartet *(Digital*—Vox Cum Laude)

317677. Schubert: Symphony No. 8 (Unfinished); **Rosamunde Overture and Ballet Music**—von Karajan, Berlin Philharmonic (Angel)

321729. Schubert: The Impromptus, Op. 90 & 142—Murray Perahia, piano *(Digital*—CBS Masterworks)

325092. Schubert: Sonata in B Flat; etc.—Alicia de Larrocha *(Digital*—London)

320432. Schubert: String Quartets Nos. 12 & 13 (Quartettsatz)—Juilliard Quar. (CBS Masterworks)

TCHAIKOVSKY

312777. Tchaikovsky: Capriccio Italien; Rimsky-Korsakoff: Capriccio Espagnol; etc.—Bernstein (CBS Great Performances)

308874. Tchaikovsky: Piano Concerto No. 1—Gavrilov; Kitaenko cond. Moscow Radio/TV Sym. Orch. (Col./Melodiya)

231563. Tchaikovsky: Swan Lake and **Sleeping Beauty Ballet Suites**—Ormandy, Philadelphia Orchestra (Columbia)

329169. Tchaikovsky: Symphony No. 4—Lorin Maazel, Cleveland Orch. (CBS Masterworks)

245399. Tchaikovsky: Symphony No. 6 (Pathetique)—Ormandy and Phila. Orch. (Columbia)

304352-394353. Tchaikovsky: The Nutcracker (complete)—Andrew Davis, Toronto Symphony (Counts as 2—Columbia)

173666. Tchaikovsky's Greatest Hits—*Waltz Of The Flowers; 1812 Overture;* more. Bernstein, NY. Phil.; Ormandy, Phila. (Columbia)

293191. Tchaikovsky: Violin Concerto; Meditation—Stern; Rostropovich, National Sym. (Columbia)

BAROQUE

323543. Handel: Royal Fireworks Music; Oboe Concertos 1-3—Karl Munchinger, Stuttgart Chamber Orch. *(Digital*—London)

324087. Handel's Top Tunes—Richard Kapp and Philharmonia Virtuosi of NY.! *Arioso, Largo,* etc. (CBS)

329615. Handel: Water Music—Malgorie, La Grande Ecurie & la Chambre du Roy *(Digital*—CBS Masterworks)

326595. Music For The Kings of France—harpsichord suites by Marchand and Couperin. Igor Kipnis (Nonesuch Silver Series)

316406. Pachelbel Canon & Other Baroque Favorites—Boyd Neel, Toronto Chamber Orch. *(Digital*—MMG)

324525. An Isaac Stern Vivaldi Gala: Concertos For 2 and 3 Violins; etc.—Stern, Zukerman, Perlman, others (CBS Masterworks)

MODERN

325274. Berg: Lulu Suite—also Schoenberg, Webern. Ormandy, Philadelphia Orch. (Masterworks Portrait)

263293. Bolling: Suite For Flute and Jazz Piano—Rampal, Bolling (Columbia)

240473. Copland: Appalachian Spring (complete)—Copland conducts London Symphony (Columbia)

309500. Copland: Rodeo; Billy The Kid—popular ballet scores played by Bernstein, New York Phil. (CBS Great Performances)

326439. Copland: Rodeo; Dance Symphony; El Salon Mexico; Fanfare for the Common Man—Dorati, Detroit Sym. *(Digital*—London)

329060. Falla: Nights In The Gardens Of Spain; Three-Cornered Hat (Suite No. 2); etc.—Osorio, piano; de la Fuente, Xalapa Sym. *(Digital*—Vox Cum Laude)

319004. Glass, Philip: The Photographer—"Some of his best music to date"—*Time* (CBS)

201665. Grofe: Grand Canyon Suite—Ormandy, Phila. Orch. (Columbia)

326272. Holst: The Planets—Bernstein, New York Phil. (CBS Great Performances)

326256. Ives: Symphony No. 4; Robert Browning Overture—Stokowski, cond. (Masterworks Portrait)

318246. Orff: Carmina Burana—Muti, Philharmonia Orch. & Chorus (Angel)

318691. Prokofiev: Love For Three Oranges Suite; Lt. Kije Suite—Thomas, L.A. Phil. (CBS Masterworks)

324533. Respighi: Feste Romane; Pines & Fountains Of Rome—Dutoit, Orch. de Montreal *(Digital*—London)

326223. Schoenberg: Pelleas & Melisande—Barenboim, Orch. de Paris (CBS Masterworks)

324046. Shostakovich: Cello Concerto No. 1; Kabalevsky: Cello Conc. No. 1—Yo-Yo Ma, cello; Ormandy, Philadelphia Orch. *(Digital*—CBS Masterworks)

281493. Stravinsky: Rite Of Spring, Zubin Mehta, NY. Phil. (Columbia)

326405. Stravinsky: The Firebird (complete ballet)—Dohnanyi, Vienna Philharmonic *(Digital*—London)

326322. Varese: Density; Ionisation; Integrales; etc.—Craft, Columbia Sym (Masterworks Portrait)

ROMANTICS

325308. Berlioz: Lelio—Boulez conducts soloists, London Symphony & Chorus (Masterworks Portrait)

325282. Bruch: Violin Concerto; Lalo: Symphonie Espagnole—Francescatti; Mitropoulos, Schippers, cond. (Masterworks Portrait)

326454. Dvorak: Cello Concerto; Bruch: Kol Nidrei—Harrell; Ashkenazy, Philharmonia Orch. *(Digital*—London)

326926. Dvorak: Legends—Zinman, Rochester Phil. *(Digital*—Nonesuch)

325381. Grieg: Piano Concerto; Schumann: Piano Concerto—Leon Fleisher; Szell, Cleveland Orch. (Masterworks Portrait)

228684. Grieg: Peer Gynt Suites 1 and 2; Bizet: Carmen Suites—Leonard Bernstein and the New York Phil. (Columbia)

321190. Liszt: Hungarian Rhapsodies 1, 4, 6; Rakoczy March; etc.—Boskovsky, Phil. Hungarica (Angel)

305730. Mendelssohn: Symphony No. 4 (Italian); **Overtures**—Andre Previn, London Symphony (Angel)

309492. Mussorgsky: Pictures At An Exhibition; Night On Bald Mountain—Bernstein, New York Phil. (CBS Great Performances)

310698. Offenbach: Gaite Parisienne; Saint-Saens: Danse Macabre; Dukas: Sorcerer's Apprentice—Maazel, Orch. National de France (Columbia)

245043. Rachmaninoff: Piano Concertos No. 1 & 2—Ashkenazy; Previn, London Symphony (London)

176578. Rachmaninoff's Greatest Hits—*Vocalise; Piano Concerto No. 2; 3 Preludes;* etc. Various artists (Columbia)

318436. Rimsky-Korsakov: Scheherazade—Svetlanov, London Symphony (Angel)

325100. Saint-Saens: Carnival of the Animals—also works by Debussy, Satie. Philip Jones Brass Ensemble *(Digital*—London)

300871. Saint-Saens: Piano Concerto No. 3; Africa; more—Entremont; Plasson, cond. (Columbia)

314260. Salieri: Sinfonia Veneziana; more—Pesko, cond. (CBS Masterworks)

234237. Schumann: Piano Concerto; Mendelssohn: Piano Concerto No. 1—Rudolf Serkin; Ormandy, Phila. Orch. (Columbia)

225888. Smetana: Moldau, Bartered Bride Overture, Dances; Dvorak: Carnival Overture—Bernstein, NY. Phil. (Columbia)

310870-390872. Johann Strauss' Greatest Waltzes Ormandy, Szell, Bernstein (Count as 2—Columbia)

320424. Richard Strauss: Ein Heldenleben—Dicterow, violin; Mehta, NY. Phil. *(Digital*—CBS Masterworks)

202796. Richard Strauss: Also Sprach Zarathustra—Bernstein, New York Philharmonic (Columbia)

326660. Suppe: Overtures—*Poet and Peasant; Light Cavalry;* etc.—Solti, Vienna Phil. (London/Jubilee)

326447. Verdi: Overtures—*La Forza del Destino; I Vespri Siciliana; Nabucco;* etc. Chailly, National Philharmonic *(Digital*—London)

321844-391847. Verdi: La Traviata—Original Motion Picture Soundtrack. Stars Domingo, Stratas (Counts as 2—Elektra)

323733. Wagner: Orchestral Music from "The Ring"—*Ride of the Valkyries,* etc. Mehta and New York Phil. *(Digital*—CBS Masterworks)

310086. Wagner: Overtures—*Flying Dutchman; Rienzi;* etc. Maazel, Philharmonia Orch. (Columbia)

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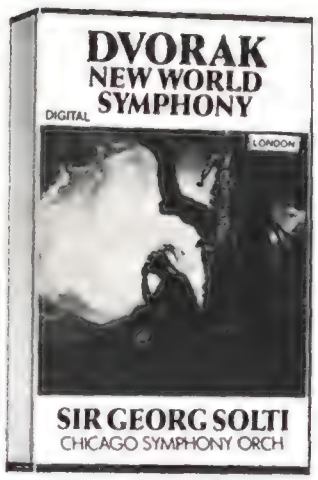

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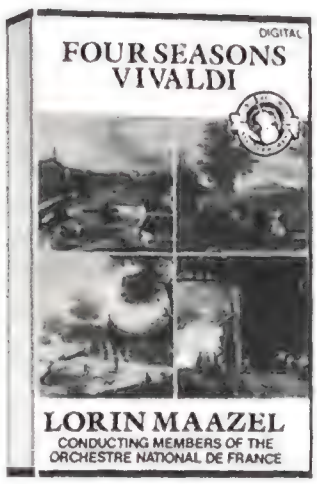

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Around the Mall and beyond

During Dr. Michael Robinson's 18 years at the Smithsonian Tropical Research Institute in Panama, he sometimes had to forsake the tropics for an official visit to the Mall. He never seemed to have the right clothes for Washington's half-hearted yet miserable winter. He recalled this as we hurried, lunch-bound, along Connecticut Avenue on a bitter early-winter day.

"Once I was wearing a borrowed overcoat, much too long, through a really rotten part of town, and I realized that no one bothered me. The shills and prostitutes ducked into dark corners until I passed. It was the coat. Everyone thought I was a plainclothes cop."

Robinson now dresses appropriately for the Temperate Zone. On this day he wore an enviable woolen muffler with a panda knitted into each end. That's appropriate, too. For just a year ago this stocky, energetic Englishman with wildly blowing sandy hair and a broad Anglo-Saxon face that just misses being labeled cherubic was appointed Director of the National Zoo.

Dr. Robinson didn't assume his duties until last summer. No sooner had he and his wife settled into an apartment house –where they had to be interviewed by a screening committee of the tenants–than the zoo's summer festival took place. Several volunteers from the staff were painting the faces of visitors. The new director became a leopard.

Afterward he taxied home, still painted, so his wife could take a picture. He was met by the neighbors–"the people who had judged us straitlaced enough to become one of them"–all gathered outside his door. A frying pan on a hot stove had triggered a smoke alarm. Everyone had come to help. "And," he said, "what they found was this mad Englishman with his face painted to look like a leopard!"

"I was at STRI for so long that of course I miss it," he said as we squared away at our table. "But I'm getting used to things here–the weather as well as the demands and challenges and marvelous restaurants like this one." He raised his glass to me with a Latin American toast and settled healthily into the *foie de veau*. I gratefully followed suit, and for a while we conversed on personal matters.

He came from Lancashire, where he remembers Eighth Air Force B-17s thundering away to bomb Nazi Germany. He's been an aviation buff ever since, and says the National Air and Space Museum is his favorite place on the Mall.

Young Michael got a certificate in education at the University of Liverpool, a B.S. at the University of Wales and his doctorate at Oxford. For some years he taught science at a secondary school in Cornwall. I thought instantly of the Masterpiece Theatre offering *To Serve Them All My Days*, but when I mentioned it, he brushed it aside. "Actually," he said with a small hesitation, "this was a girls'

Zoo Director Michael Robinson takes on countenance of a leopard for summer fest.

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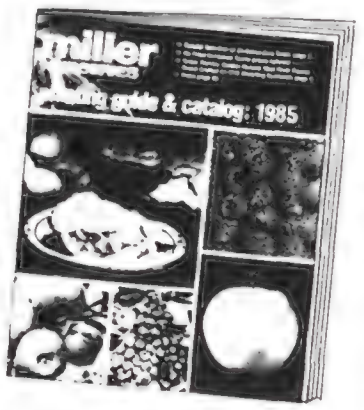

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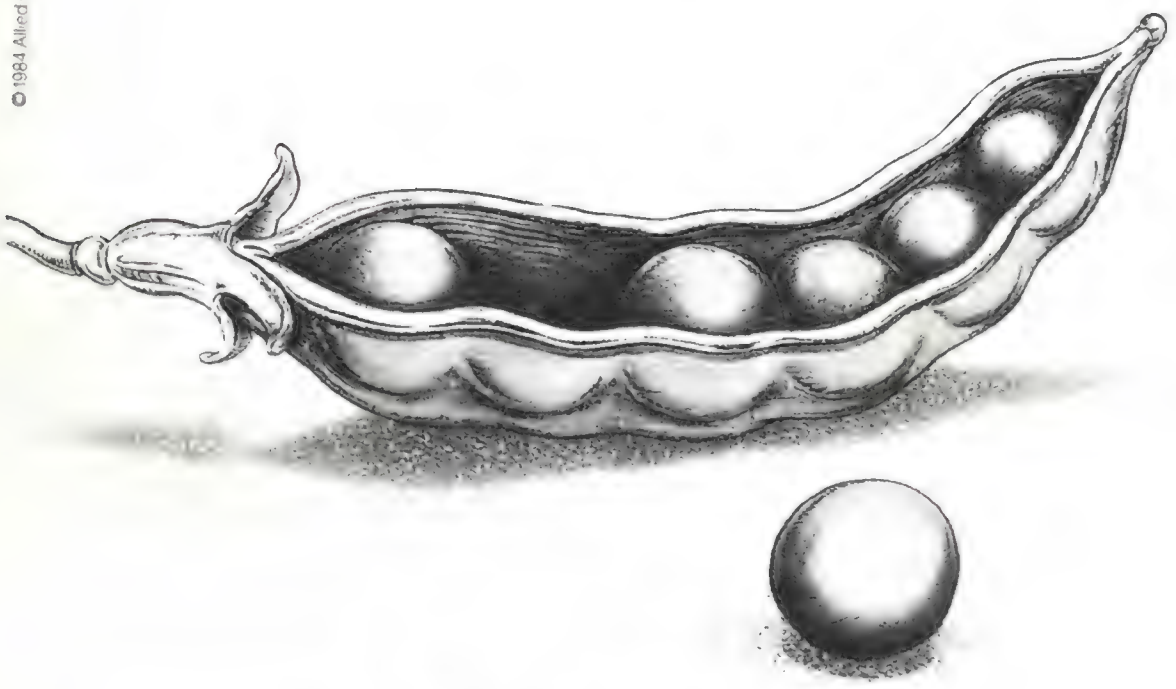

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school. I was the first male teacher ever hired there."

Yes, it was good fun. Yes, the girls got crushes on him. No, he did not disgrace himself. In fact, the school hired two other men as soon as he left. His own crushes are apt to be on animals, especially invertebrates, perhaps most of all spiders. He gets quite misty over memories of spiders he has known.

Or tasted. "In New Guinea, there are some wonderful spiders," he said. "They're among the few things you can eat in that jungle. They taste like peanut butter. Better, actually. I don't much care for peanut butter."

He is also very fond, though not in a gourmet sense, of otters. He and his wife had a pet otter, endlessly entertaining and rewarding—except for its habit of getting into bed sopping wet. And he has a lot of admiration for fish. They comprise one of the projects that he has in mind for the zoo.

After lunch we braved the tooth-chattering afternoon to see what changes Dr. Robinson would like to make in his domain. We'd barely started our tour from the zoo's administration building before he gestured at the white-bearded wildebeest enclosure and said, "Here's a good place for the aquatic exhibit."

He didn't say "aquarium," because he would like to put other aquatic creatures —otters, manatees, birds, for example—in with the fish. He's always felt that the National Zoo should include a wider range of aquatic life, particularly fish.

Robinson's vision of a national aquatic habitat at the zoo has already earned the promise of planning money. It looks as though the wildebeests will have to move elsewhere.

We headed for one of my favorite places, the Elephant House. "This needs work," he said as we entered. "It's really pretty tatty inside." And despite my affection for it, I suddenly saw how badly it needed paint, how drearily basic the quarters were—bare concrete floors, reinforced walls, heavy iron bars. Like Alcatraz. "I'd like to see acacia trees painted on these walls, and have planters suspended overhead—hanging gardens, you know—and perhaps bring back the little squirrel monkeys we once had that used to race around the beams under the ceiling. We could work wonders with volunteer help from FONZ (Friends of the

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National Zoo) the way we did with the wonderful new play equipment we built for the pandas."

"There should be music in here, too," said Dr. Robinson, partly to me and partly to a woman keeper whom Nancy, the African elephant, obviously adores.

"Do they like music?" I asked.

"Not opera," said the keeper. "They can't stand opera. But they like the *Scheherazade* suite—oh, and Willie Nelson. They love Willie Nelson."

Outside it was colder than ever. We hurried along the main walk, where Robinson wants to see new trees and herbs planted, past a couple of bison ("Bison were the first animals in the zoo," he reminded me), past the Small Mammal House ("I like this place. I'm a small-mammal addict") and on to visit the gorillas. Their quarters are fine, though Robinson doesn't like the soundproofing. "People should be able to hear the roars and grunts and the chest-beatings." But they're not breeding.

Gorillas, it seems, don't breed well in captivity. At our zoo, two of the three males are sterile, and one does not copulate. Two of our females, therefore, will soon be paired with males from other zoos. The third female is turned on to humans to such an extent that she's not interested in other gorillas. For her, the zoo is considering a program of artificial insemination and in vitro fertilization.

At the Reptile House, Robinson took me into a lower level where work is already progressing on one of his pet projects—an exhibit of invertebrates. He has always felt that humans too often ignore the fascination of invertebrates because of their predilection for furry, round-eyed creatures. "We may have a deep-seated preference for fellow mammals," he says, "but there are wonderful things to be learned from invertebrates."

So this exhibit, already abuilding—and populated when I saw it with a healthy-looking tarantula and, I was assured, a couple of lurking scorpions—will feature a minitheater where drops of pond water, enormously magnified, will display their burgeoning life forms, where a cuttlefish will show how it changes color instantly to signal to its companions.

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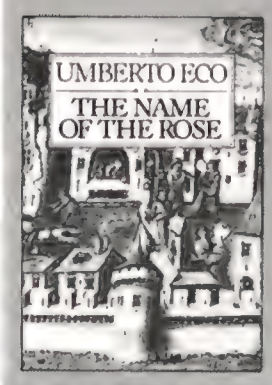

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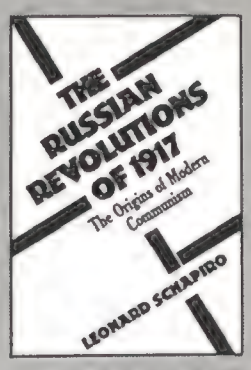

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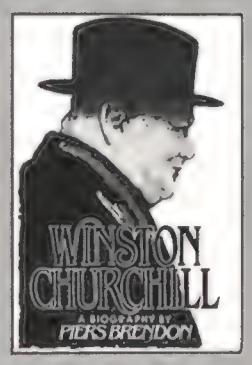

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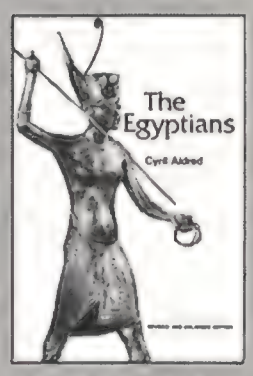

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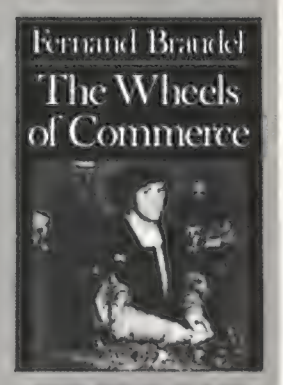

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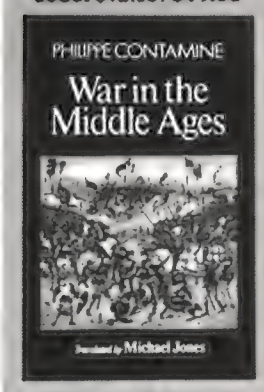

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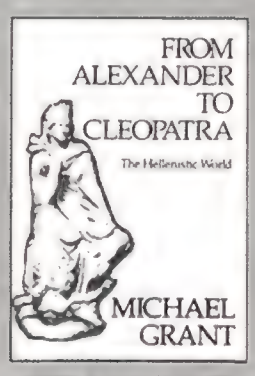

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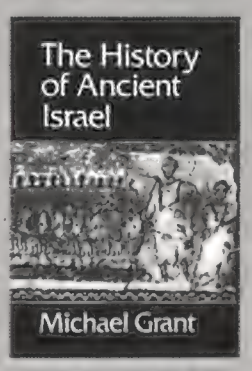

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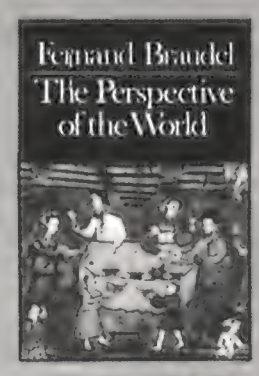

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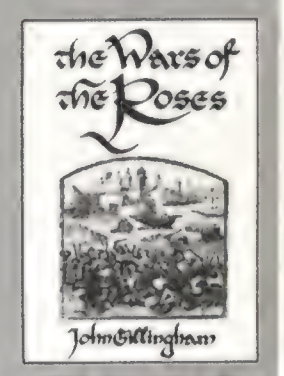

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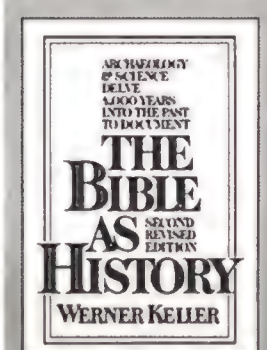
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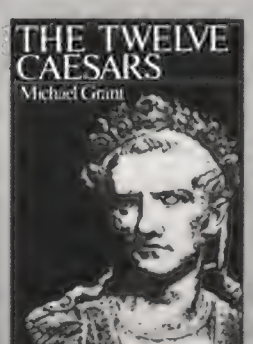

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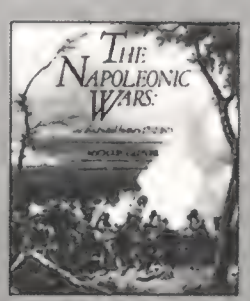

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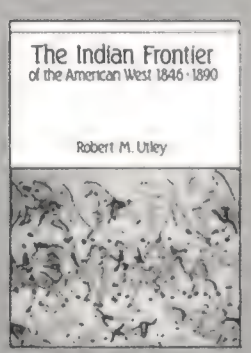

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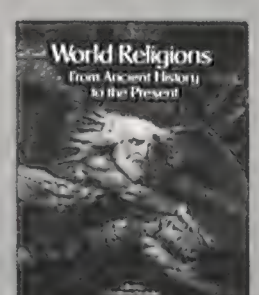

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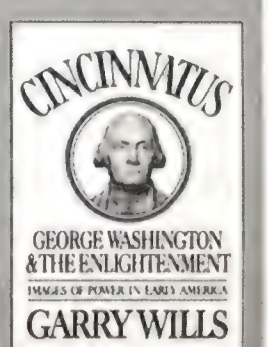

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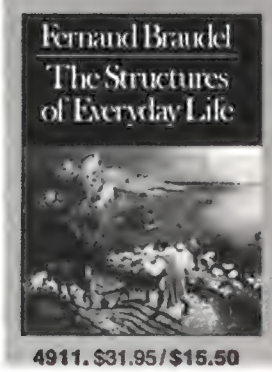

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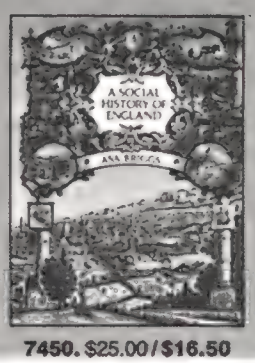

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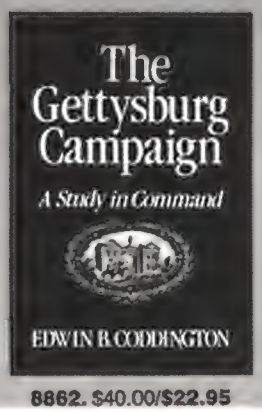

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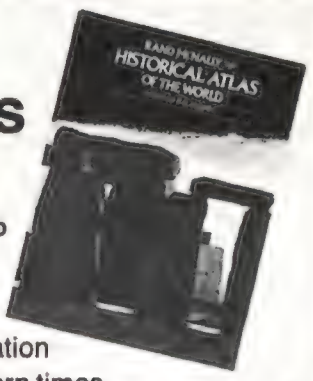

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colony of leafcutter ants and a hive of honeybees. I'd like to show people how some scorpions turn fluorescent green under ultraviolet light. Of course I'd also want to have a lot of spiders."

Smacking his lips over the prospect, my guide stepped once more into the chill to show me how Olmstead Walk, the zoo's main thoroughfare, will be altered to make room for a settlement of gibbons in tree-shaded cages shaped like circus tents. These structures will be more than 100 feet long (gibbons need at least 100 feet to get up to full speed) and will contain vegetation that will allow the animals to do their truly remarkable acrobatics. The viewing modules looking into these huge display cages will take the shape of African huts.

Robinson feels strongly that people should be able really to *see* what zoo animals are like, to watch them moving and playing and being themselves. "Too often I've watched visitors stand before an exhibit and then heard them say, 'Come on, let's go, it's not in there.' But it really *is* in there, you know. It's just curled up in a dark place. There should be ways to keep it moving around while people are looking *at* it."

Michael Robinson tells about a zoo where polar bears were kept active in front of their audience by means of a fish-thrower. "It worked like a baseball pitching machine, chucking pieces of fish into the bear compound so that the animals would dash about trying to catch them."

The device was activated by a bear's growl. The animal would bellow at it and the arm would flip out a fish. "Finally," continued Dr. Robinson, "the male bear worked it out. He got his mate to stand beside the machine and growl at it, and he simply sat up where the fish were landing and caught them without moving."

Snow now threatened, and from the wolves' enclosure a chorus of howls rose that made you think of Alaska. "What a wonderful place," murmured Michael Robinson as he half ran, muffler flapping, up the hill toward his warm office.

It is indeed wonderful. And surely one day it will be what this restless, hurrying, exuberant enthusiast told me he wants: the finest zoo in the nation.

Edwards Park

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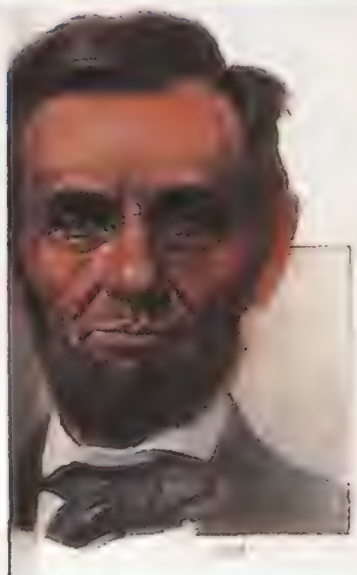

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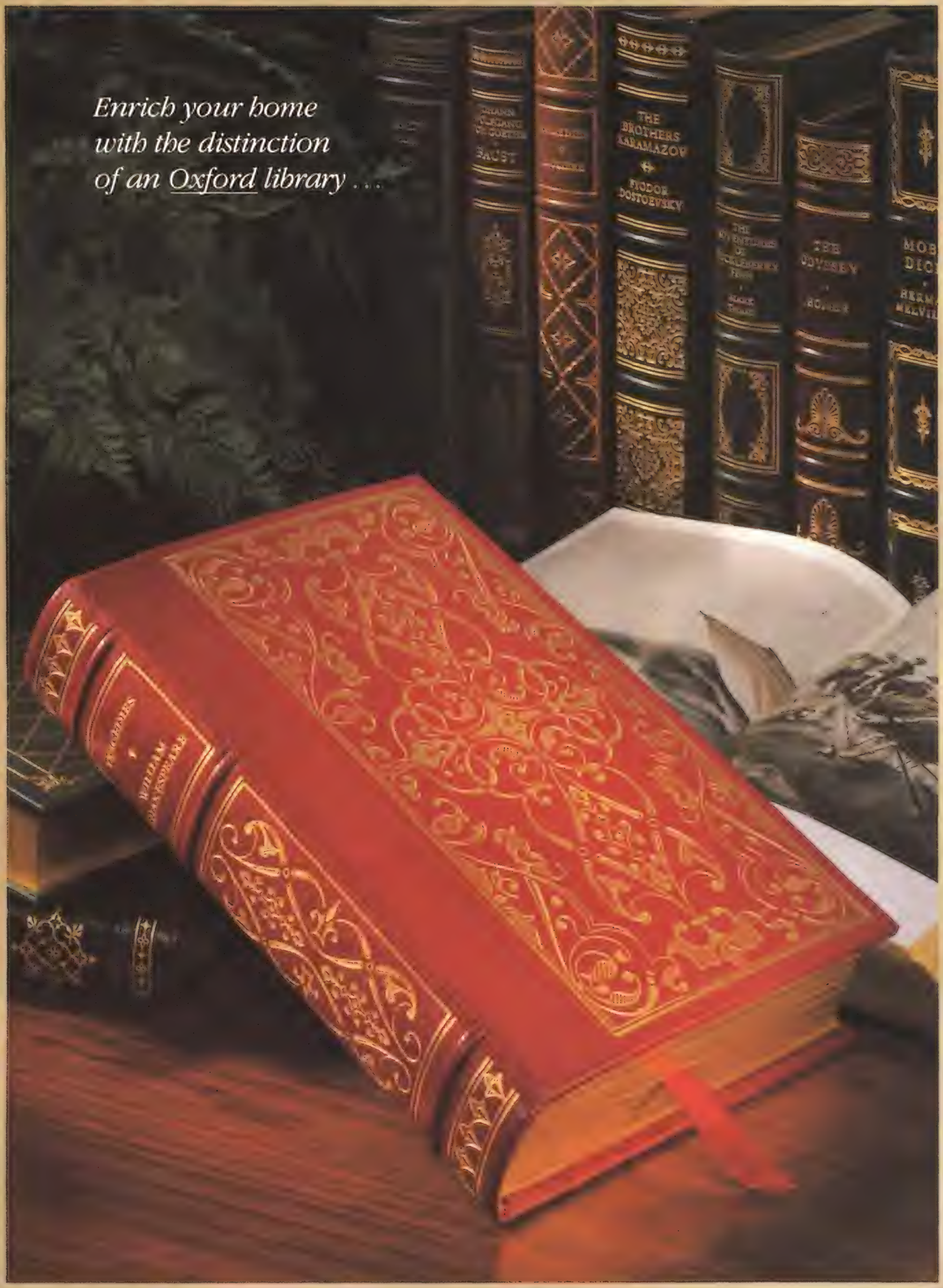
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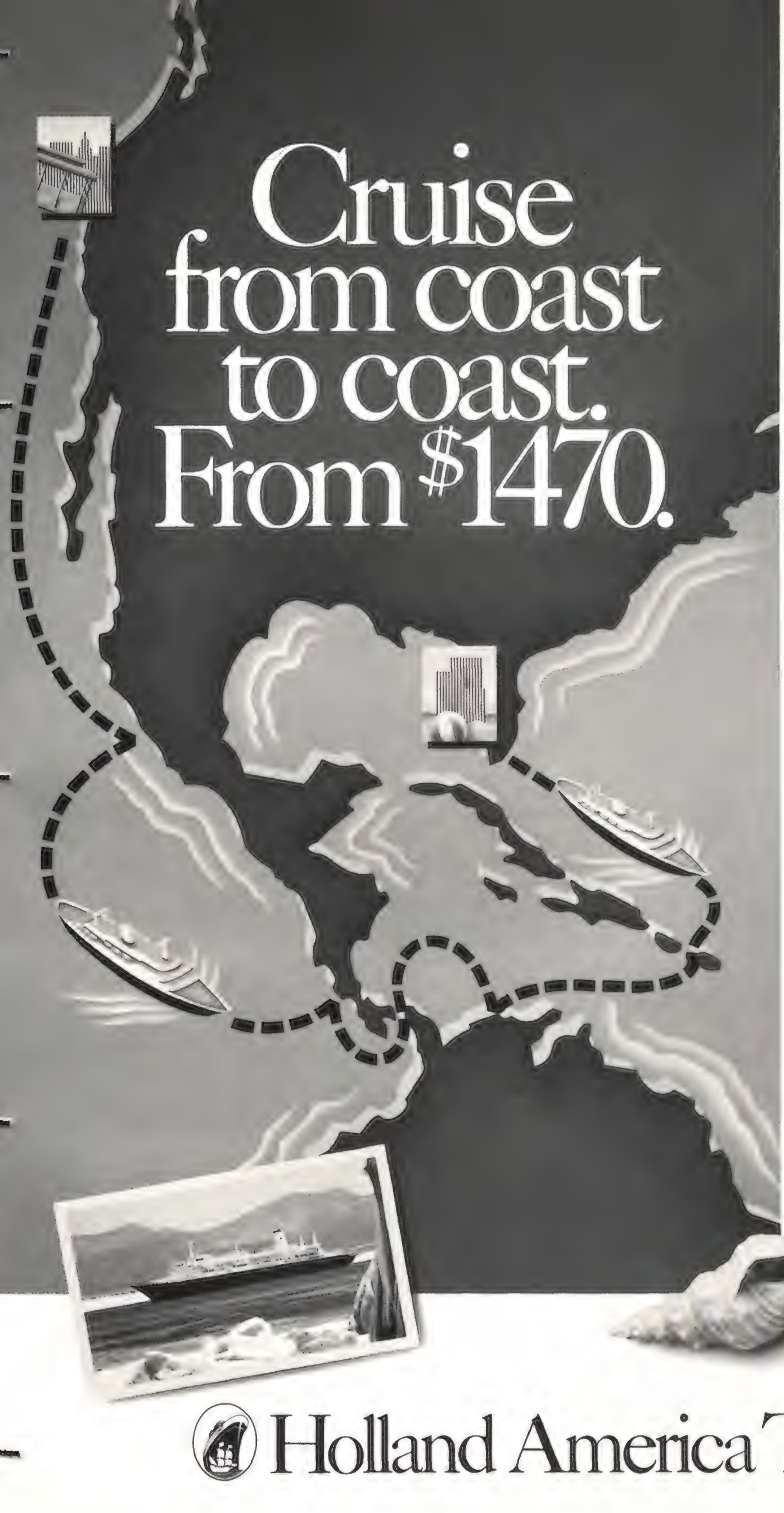
The winged creatures of Florida Bay are a marvel to watch and a tonic for the gray mornings of a northern winter

It is no longer clear to me why so many of us still live in the northern parts of the country. Custom, habit—call it what you will. Could it also be a failure of imagination? Day after day we bundle up, readying for temperatures that can make us gasp, and plunge out into weather that seriously contests our ability to function. We mutter about beastly weather, but don't think to do anything about it.

And yet just two hours south of Washington, D.C., for example, is a whole different world. Commercial fishermen ply their trade in undershirts. Tiki bars broadcast popular music into the subtropical night. And a birder who spends his winters slowly freezing in a marsh as he numbly waits for the resident great blue heron to make an appearance can reasonably conclude he has died and gone to heaven.

So nowadays I leap at the chance to go back to the Florida Keys, where big spectacular birds are everywhere, all the time. I love to watch the white ibises feed, sinking their red decurved bills into the water and mud right up to their red faces, probing in a steady rhythm like animate sewing machines. I love to watch herons and egrets move stealthily into a lagoon as the tide goes out, long necks stretched as they stare down into the water. But most of all I like to watch the big birds fly, switching in an instant from being plodders like the rest of us to sailors of the sky. Wings are the essence of birdness for me, and I never tire of watching them.



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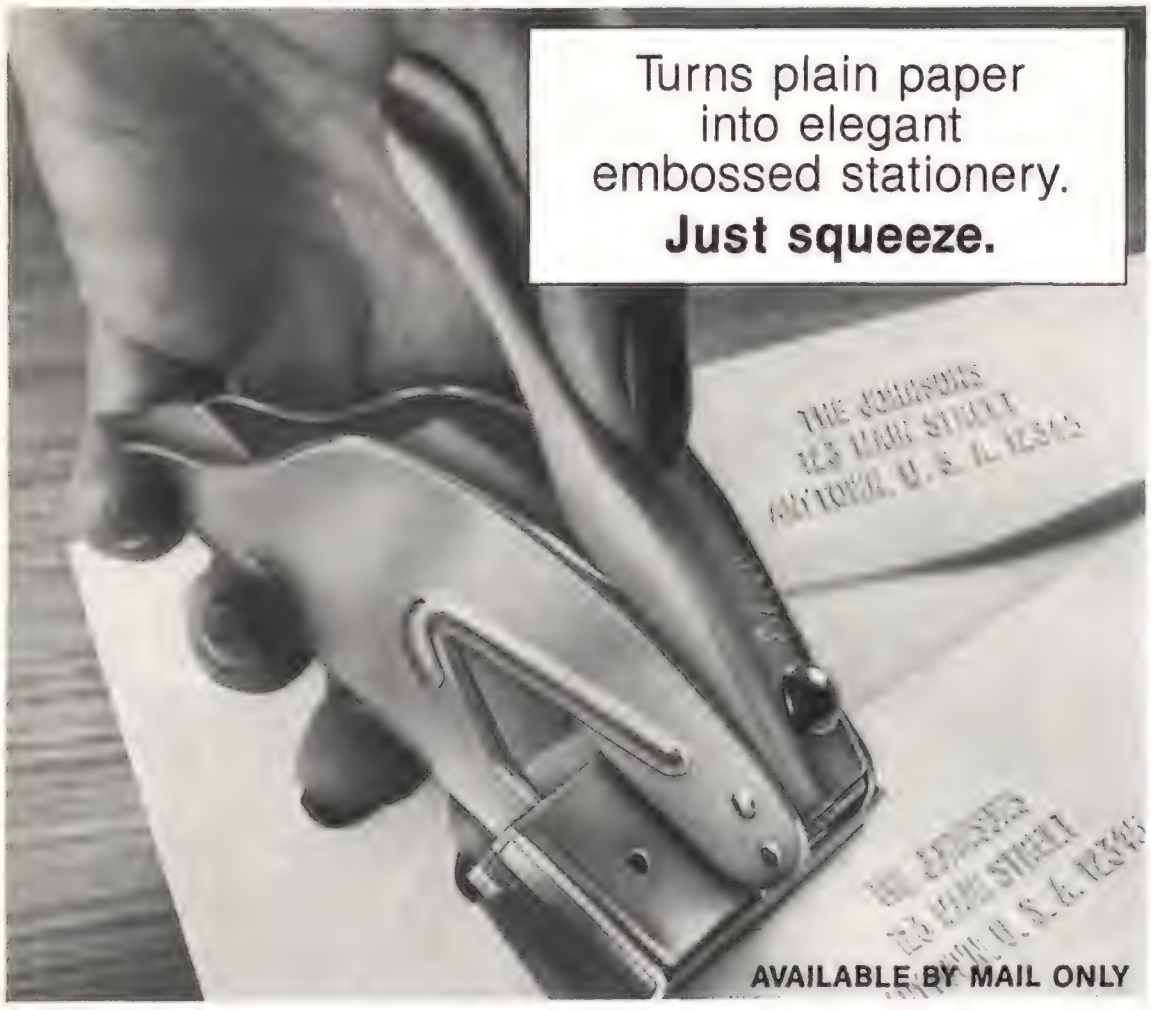

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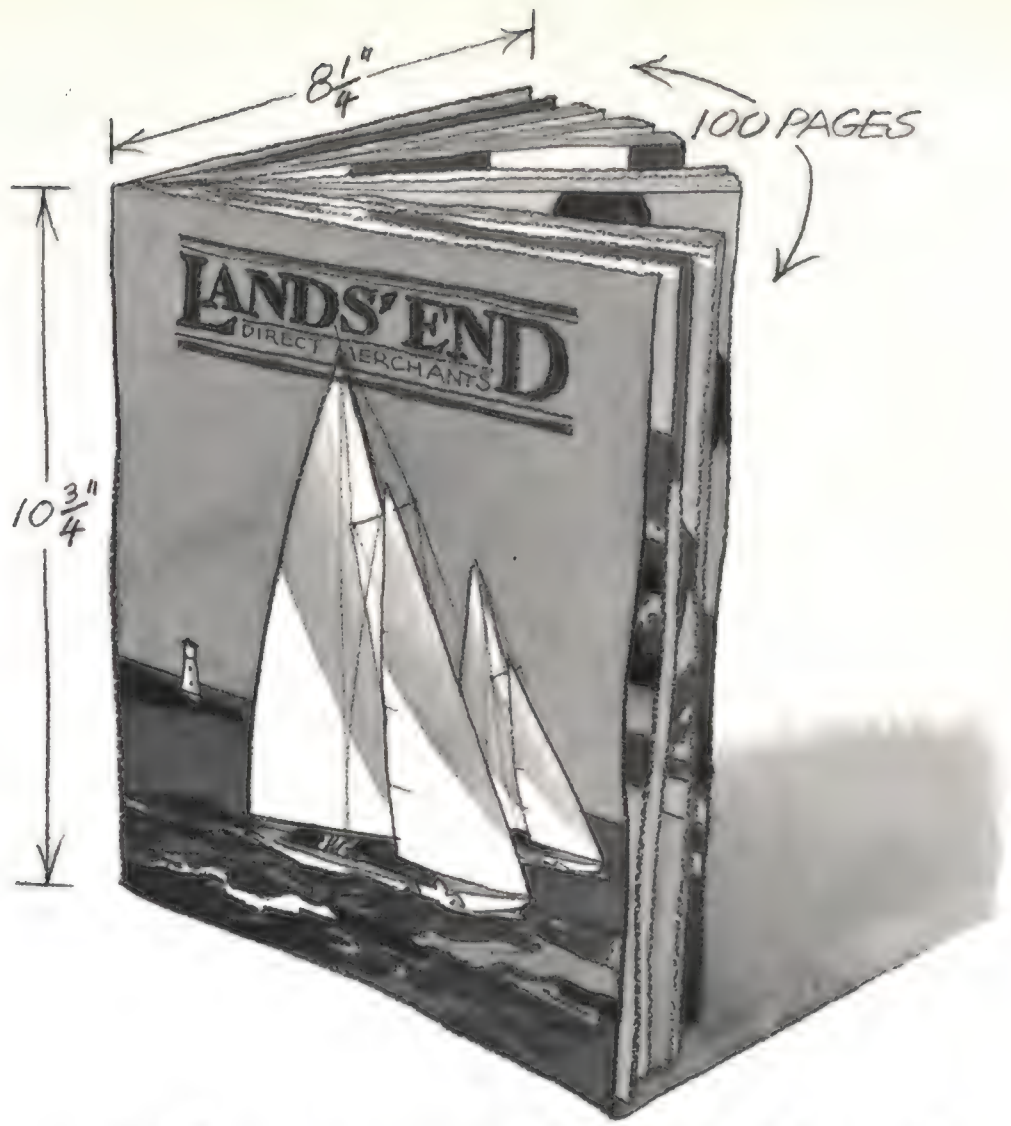
Comical though they may be, pelicans have strength and grace on the wing.

At sunset on the first day of the latest trip, our boat drifted silently along the shore of Nest Key in the northeastern reaches of Florida Bay. Roseate spoonbills, improbably pink in the warm light of the setting sun, were coming in to roost. Wings held high, they would alight on a swaying branch, holding their heads lower than their feet until they reached a semblance of balance. Then gradually the head would come up, the wings would come down, and the bird would settle into place.

Walking along a beach another day, I watched an osprey fly out over the water ahead of me. Every hundred feet or so the great fish hawk would dip his feet into the water as he flew, probably to wash off fish slime. After half a dozen dips, he settled down into the water, wings outstretched and waving. Just when I began to think something was wrong and the bird was in trouble, he reached his wings up high and lifted himself out of the water to fly down the shore and out of sight.

The next day I was in a dinghy watching a bald eagle tear apart a cormorant. The eagle had its prey tangled in the branches of a young red mangrove about a foot above the water. It would lean its head down and tear off a piece, then quickly raise its head again to look around while swallowing. As it pulled at the cormorant, it would raise its chocolate-brown wings, flapping slowly to keep its balance. Its great yellow bill and white head glowed in the sunlight, as did the blood on its throat.

The best time of all came in two days of total immersion, two days on a houseboat anchored in the lee of an unnamed key in Florida Bay. The little island was shaped like two overlapping circles that textbooks use to illustrate simple set theory, perhaps two acres in all. A few hundred yards to the left was a much



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larger key and to the right a couple of smaller ones. They were all high points on a long shoal that ran all the way south to the inhabited keys we could see in the distance. Young red mangroves grew out of the water in every direction.

Our home was monastic in its simplicity. A platform had been fastened to two 24-foot pontoons, and an eight-by-ten-foot cabin erected. Inside was a single bunk, which aging writer claimed from young photographer. Being inside was no barrier to the outside world: large windows on three sides and a door and two windows on the fourth brought the outside in. (In fact, I woke with a start one morning at 4:30. Light streaming in the window was so bright that I thought the Coast Guard or the Florida Marine Patrol was coming alongside, pinning us with their searchlight. I staggered outside to find it was the last quarter moon, preternaturally bright in that clear air.) A ladder gave access to the roof, but for those of us lounge lizards who like our creature comforts, a cushion-covered cooler on the forward side of the cabin was best. The island seemed primeval: the water, the sky, and the island dead ahead constituted the entire universe. It could have looked like that a thousand years ago.

At midday activity was muted. A couple of great white herons, morphs of the familiar great blues, rested in the upper branches, while more herons and egrets hunted the shoal. Double-crested cormorants flew to and fro, or swam around in flocks of 40 and more. So the photographer and I went exploring in the dinghy. (Coming back took some doing. The houseboat had dragged anchor in the 15-knot breeze and was heading west for the Gulf of Mexico. It called for some inspired rowing before it became clear that we could catch it. Back at the island, we waded through the shallows to place two anchors by hand.)

By five o'clock the day was coming to an end, and business picked up until it resembled rush hour at Washington's National Airport. Like many people, I still am fascinated by flight, and periodically drive over to the little park that is just north of the north-south runway. It is a wonder to stand there at night and watch the lights of a descending plane farther up the river. The lights move ever so slowly, following the turns of the river on a twisting final approach. Only in the

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last seconds does the plane itself appear out of the dark—so low that your first thought is to duck. Fuselage and wings whistle in over your head and you turn to watch the plane, often angled to the runway because of crosswinds, glide in to touchdown.

Sitting on the cooler at sunset was exactly like that. The breeze was still brisk, and the houseboat was in the lee of the island. Only the traffic was heavier. Brown pelicans in twos and fours would go into long, gliding turns downwind of the boat, heading into the wind on final approach. Then they would come sailing in, passing so close it almost seemed they could be plucked out of the air. The cormorants flew hard and fast, bulleting in over the water and then soaring up high to come to a thrashing stop in the treetops. Great white herons flew up along the shoals, necks folded up to give them a back-leaning bow like some turn-of-the-century four-stacker, and alighted in a white shower of dignity and grace. But it was the pelicans that came in like long-distance jets, gliding mostly, flying heavily and yet powerfully. Watched from behind, they looked like so many transports in the moments before touchdown. (The actual landings presented diplomatic problems. If an arriving pelican came too close to some that had already landed, they would raise their bills and hiss him off.)

Other fliers appeared. A turkey vulture circled the island, low over the water. And then magnificent frigate birds materialized in the dusk, their long bills, long wings, and fabulously long forked tails silhouetted against the last color in the high clouds. They hovered over the island, 24 of them, balancing on the wind with subtle adjustments of wing or tail. In the gathering darkness more pelicans slipped by us toward the island.

In the moonlit early morning hours, through binoculars, the herons stood out clearly. The pelicans, with only their heads and long necks and bills visible in the leaves, were more ghostly, the merest suggestion of their presence. The island was peaceful to the eye, but not to the ear. A chorus of creaks, belches, bleats, croaks and squawks, together with the rhythmic cheeping of young birds in the nest, washed across the dark water.

And then as the sky began to lighten, the film reversed and birds began to leave the island, cormorants slapping the water as they strained for altitude, the pelicans brushing the water with slower, more powerful beats.

Later in the morning I got too close. Thinking that all the birds that were going to leave had left, I took a little row around the island. At each indentation, there would come a thrashing and a splash, and then a cormorant would appear out of the water and fly away. They apparently were dropping straight down through the trees into the water, and then swimming underwater away from the island until they came up to fly.

Those wingbeats are with me still. Sometimes I wake in the first gray light and hear them. The sounds of trucks and buses already echo in the streets outside, sleet rattles against the window glass, but I hear none of it. Instead I hear the "whisk, whisk" of great wings driving those birds to their island of refuge. I hear the "splish, splish" of those same wings lightly striking the water as their owners start a new day. And I lie in bed plotting my return.

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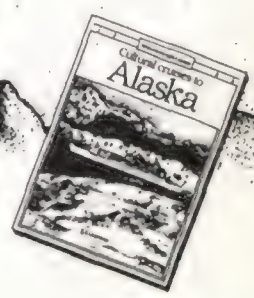

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By Nigel Sitwell

The 'queen of gems'—always stunning, and now more cultured than ever

Natural pearls have had a special glamour all through history, but these days it's hard to tell them from ones grown down on the farm

The sun blazed down from an azure sky and a slight breeze ruffled the clear blue waters of the Gulf of Thailand. A rickety wooden pier extended out from the beach into the sea. It was a picture-postcard scene, but there were no tourists here, for this was a pearl farm belonging to the Naga Pearl Company of Bangkok. And on the pier, shaded from the sun, sat Michiaki Ichimura, a middle-aged Japanese man who has devoted 27 years of his life to the pearl business.

Wearing an open-neck shirt, gray trousers and a pair of sandals, Ichimura was hard at work peering into the slightly opened shell of a gigantic oyster. Deftly manipulating a pair of shiny surgical tools, he finally lifted out a glowing, rainbow-hued sphere. He took it between his fingertips and turned it this way and that, examining it critically. Then he looked around and his face creased into a broad smile. "It's beautiful," he said, offering it for inspection.

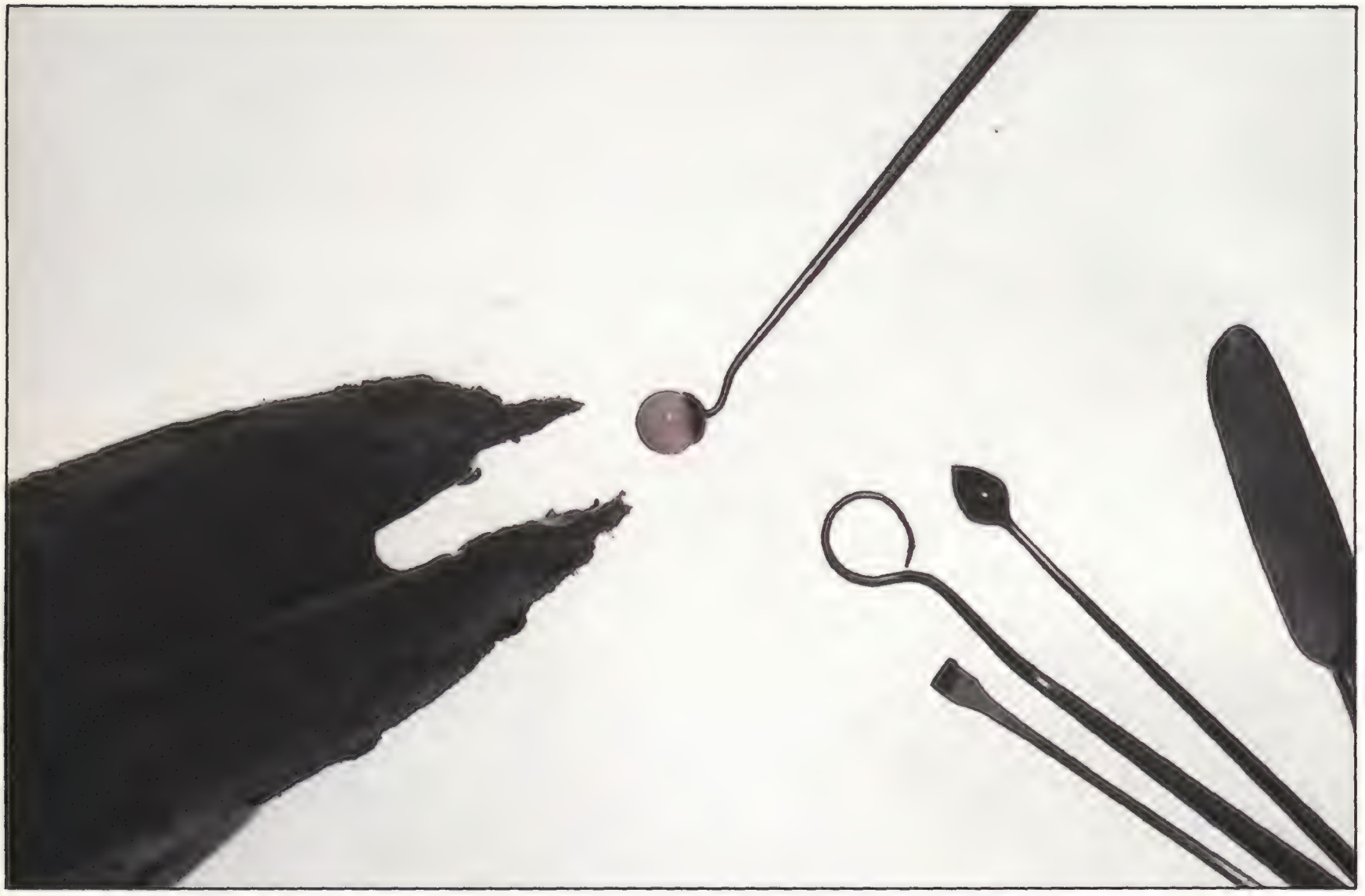
And indeed it was beautiful. The near-perfect gem that Ichimura had fished out of the silver-lipped pearl oyster was one of the large cultured pearls known as South Sea pearls. It measured about 15 mm (.6 inch) in diameter and Ichimura said that it was the best he had seen in four years. Later it was valued at more than $6,000, and by the time it reached a buyer, its value might have escalated to about $20,000.

Even at that gaudy price, there was little doubt that Ichimura's lustrous jewel would find a ready buyer

On a pearl farm in Thailand, cultured gem is extracted by technician from living tissue of South Sea oyster.

Plucked from the bottom of the sea, the Dudley pearl is one of the finest natural specimens in the world.

Photographs by Michael Freeman



A natural pearl occurs when an irritant gets inside an oyster's shell accidentally. A cultured pearl results after insertion of artificial nucleus (center). Surgical tools are used to implant nucleus and remove the pearl.

because pearls are more popular today than ever before. Couturiers are giving them a big play in their collections. Fashion magazines and trade journals are replete with them. Designers are enthusiastically featuring them in all manner of exquisite jewelry, from earrings, pendants and necklaces to rings, bracelets and brooches. Most significant of all, more and more women are wearing them—and men are too.

Imports into the United States, which is by far the world's largest consumer of pearls, have leaped more than ninefold in the last seven years. Sales have skyrocketed from $54 million in 1977 to more than $600 million last year. The pearl action is picking up in other countries, too, and many dealers are convinced that the demand will soar even higher.

Pearls have long been a staple item in the jewelry collection of the well-groomed woman of means, of course. But the typical modern pearl buyer is less likely to be as sophisticated and affluent as in years gone by. One pearl industry spokesman estimates that the sale of relatively inexpensive items—lower-quality necklaces in the $150 to $300 range, for example—may now account for as much as 40 to 50 percent of the unit volume in trade. Much of that business is being transacted not in the traditional American jewelry store but in department stores, discount houses, chain stores and shopping malls all across the country. The "queen of gems" has lost none of its cachet but it does seem to be acquiring a more egalitarian constituency.

What's behind the pearl boom? The whims of fashion, basically, and perhaps a dash of politics as well. The pearl has always been considered a classical gem and as such its popularity seems to peak in periods when the formal look is in. Conversely, the pearl does less well when conservative styles fall out of favor. That's what happened in the 1960s, when dressing down created such a poor environment for pearls that the industry actually went into a recession. Now that fashionability is experiencing a renaissance, so is the pearl. Some analysts speculate that there is a connection between the popularity of pearls and conservative political administrations. "Pearls were strong under Eisenhower and they're strong now," observes Richard Reuter, who is president of Leys, Christie & Co., Inc., a cultured pearl importer in New York, and the current head of the Cultured Pearl Association of America.

Every gem has its own special qualities, but in some respects the pearl is more special than others. It's not the only organic gem (jet and amber come from plants) but it is one of only a few (such as coral) that come from animals. The fact that it originates naturally in the ocean or a lake or river conjures up for many women an irresistibly romantic image of Venus emerging from the sea on a shell. Unlike diamonds, rubies, sapphires and emeralds, moreover, pearls are not hard. They're soft, velvety, warm and sensuous. "In the jewelry business, pearls are considered the most feminine of gems," one dealer says. Adds Veronique Ma'Arop, a buyer with Van Cleef & Arpels: "I don't know a woman who doesn't like pearls."

There's no mystery about what makes pearls so appealing. Most gems are beautiful in a flashy sort of way but pearls are elegantly understated. They respond to different kinds of light in subtle ways that enhance the tonality of a woman's skin. They focus attention on the wearer, not on themselves, and a pearl necklace forms the perfect frame for a woman's face. Practically speaking, a fine necklace of cultured pearls looks just about as impressive as one of diamonds, but it is not nearly as expensive. Depending on the size and quality of its pearls, a 16-inch necklace might range in price from less than $500 to $2,000 or $3,000.

In ancient times, there were many fanciful theories about the origin of pearls. The real explanation is quite simple. Every mollusk that has a shell can produce a "pearl," and it will be inclined to do so whenever a foreign body enters its system. The mollusk's reaction is to cover the irritant with layers of the substance its shell is made of. However, only those mollusks that line their shells with nacre, or mother-of-pearl, produce what we know as pearls. Nacre is composed of nearly 90 percent calcium carbonate and around ten percent conchiolin, a gluelike protein that binds together the calcium carbonate crystals.

The pearls esteemed in jewelry come only from the pearl oysters of the genus *Pinctada* or from a variety of freshwater mussel species. In a natural pearl, the nucleus that starts the whole process may be a grain of sand, a parasitic worm, a zooplankton skeleton, or even a tiny fish or crab that has slipped inside the bivalve accidentally. The gem that Michiaki Ichimura plucked from his oyster in Thailand was not, however, a natural pearl. It was a cultured pearl. The difference is that the nucleus of the cultured pearl is deliberately inserted by man; thereafter, the mollusk takes over.

The modern pearl industry is based almost entirely on cultured gems mass-produced at thousands of farms

Nigel Sitwell was the editor of a British wildlife magazine for 16 years. A free-lance writer now, he specializes in science and natural history.

After nuclei are implanted (opposite), oysters are returned to sea in wire baskets suspended from rafts.

Security against theft is tight at Naga Pearl Company farm in the Andaman Sea off the coast of Thailand.

At harvest time, wedges are inserted in the shells of Naga's giant South Sea oysters prior to pearl removal.

Japan processes most of the world's pearls. In Kobe, a skilled worker with a large company grades gems.

Japanese pearl expert Michiaki Ichimura (right) looks over the results of one day's harvest at a Thai farm.

In Bangkok, a technician affiliated with a Japanese pearl firm examines large cultured gem of top quality.

in tropical and semitropical regions throughout the world. It wasn't all that long ago, though, when natural pearls were the sole source of supply in an exotic business distinguished by a vivid cast of wily traders, notorious pirates and intrepid native divers.

Natural saltwater pearls traditionally hailed mainly from the Red Sea and the Persian Gulf (Bahrain was almost literally built on a foundation of pearls), Ceylon (now Sri Lanka), the archipelagoes of the South Pacific, the Gulf of Panama, the Gulf of California and other warm waters in the Americas. Freshwater pearls were once found in lakes and rivers over wide areas of Asia, Europe and the western hemisphere.

Pearls have been revered and treasured from the very earliest times. They were the most valuable of all gems until the latter part of the last century, when diamonds overtook them. The oldest surviving pearl necklace dates from around 350 B.C. and was unearthed at Susa in western Iran, site of the Persian kings' winter palace. Because their translucent beauty seemed to embody such supposedly feminine virtues as purity and chastity, pearls were a popular religious symbol. They intrigued writers and poets, and they were used for medicinal purposes. Decoctions of ground pearls were drunk by Mogul emperors to improve their virility and by Charles VI of France in an attempt to restore his sanity.

Sumptuous pearl jewelry was part and parcel of the Romans' addiction to pomp and luxury. Roman ladies not only wore pearls during the daytime, but liked to adorn themselves with pearls before going to sleep so that, as one chronicler put it, "their dreams would be filled with lustrous gems." Caligula decorated his slippers with pearls and even draped a pearl necklace

After grading, a jeweler half-drills some of the pearls and attaches them to the gold setting of a brooch.

At Van Cleef & Arpels in New York, woman models necklace of cultured black pearls imported from Tahiti.

around the neck of his beloved horse Incitatus. Nero's scepter and Constantine's helmet were covered in pearls, and it is sometimes said that the freshwater pearls of Scotland may have been partly responsible for Julius Caesar's invasion of Britain in 55 B.C.

The Russians showed a keen desire to wear pearl jewelry, and this interest was not confined to the royalty. Kunz and Stevenson, in their 1908 magnum opus, *The Book of the Pearl*, recount how Jewish women of southern Russia, however humble their birth, habitually wore a black velvet cap decorated with many pearls. They would wear this throughout the day, whatever work they were doing, and at night would place it under their pillows.

A love of pearls was not confined to the Old World, for much jewelry has been found at Monte Albán in Mexico, dating from about 500 B.C., and from ancient sites in Peru. For some time after Columbus' discovery of America, the new land was known in Cádiz and Seville as The Land of Pearls.

The old-time pearl trade was an enormous and enormously complicated enterprise. Much of the brokering of Asian pearls to the rest of the world took place in Bombay (the princes of old India were among the most ostentatious pearl lovers of all time) and for centuries the gems were gathered mainly in the Persian Gulf. The pearl fisheries there were under the nominal control of the maritime Arab sheikhs, who commanded a royalty from each boat. In 1838, a British officer in India noted the scope of the undertaking: 30,000 sailors, rope attendants and divers manning 4,300 picturesque boats, 3,500 of them from Bahrain.

The workhorses of the fleet were the divers, many of them Indians and Arabs, who were literally enslaved by the pearl. The procedure was primitive: after taking two or three deep breaths, a diver would descend several fathoms on a stone attached to a rope from the boat, collect as many oysters as possible in a basket and jerk on the rope to signal an attendant to haul him up. A brief rest, then back down again. In an average day of 30 to 40 dives, each lasting a minute or so, a man might bring up 400 oysters; perhaps one in 40 contained a pearl. Not infrequently, divers were mutilated by sharks (Marco Polo reported that pearlers in Ceylon paid men to "charm the great fishes to prevent them from injuring the divers") and some of them returned to their work despite the loss of limbs.

An event that took place in Ceylon in 1905 provides some insight into the kind of excesses that too often characterized pearling. Advertisements announcing one of Ceylon's irregularly held fisheries had been placed in India and other parts of Asia. In response, a motley throng of 40,000 gem dealers, moneylenders, gamblers, fishermen, beggars and assorted hangers-on descended upon a small town near the Gulf of Manaar. In six weeks, some 5,000 divers retrieved more than 81 million oysters, which were left to rot in the sun for a week before the pearls were picked out.

Pearl fever occurred in the United States, too, in association with the extensive freshwater fisheries that centered mainly in the Mississippi River valley around the turn of the century. Whenever news came of another valuable find, the rush was on. Into the designated rivers and creeks would swarm "hunters of both sexes, of all ages, and from all classes of the community," according to a contemporary account. The gems these people found did not generally fetch as much as Oriental pearls, but it has been estimated that their

value in 1906 exceeded that of pearls from any other part of the world, except the Persian Gulf and Ceylon.

The American pearling scene may have been a bit more sedate than the Eastern fisheries but it was not altogether lacking in bizarre touches of its own. In the early 1900s, for example, a press report datelined Houston, Texas, described a huge oyster shell in the possession of a Mr. W. J. Bryan that contained a raccoon's front foot "encased" in mother-of-pearl. "The oyster himself is dead," the writer observed, "and if there is a three-footed coon in Texas who wants to get his fourth foot, he can do so by calling on Mr. Bryan."

Overfishing and pollution contributed to the demise of both fresh- and saltwater pearling but the most significant development was the introduction by the Japanese of cultured pearls in commercial quantities. The one name inextricably linked with this breakthrough is that of Kokichi Mikimoto. Born in 1858 into a family of noodle sellers, Mikimoto was fascinated by pearls and in time his experimentation with culturing led to production of a half or "blister" pearl. He was granted a patent for his method in 1896.

Mikimoto was not the first or only person to produce cultured pearls. The Chinese were apparently introducing foreign bodies into mussels during the 13th century, and other Japanese were also culturing pearls at the same time as Mikimoto. In fact, the standard industry method used today grew out of work done by Tatsuhei Mise and by Tokichi Nishikawa, a government scientist at Tokyo University. But while Mikimoto was not solely responsible for perfecting the technique, it was his tenacity, commercial drive and flair for public relations that put the cultured pearl business on its feet. Presently, all but a very small percentage of the pearls on the world market are cultured and about 70 percent of them come from Japan.

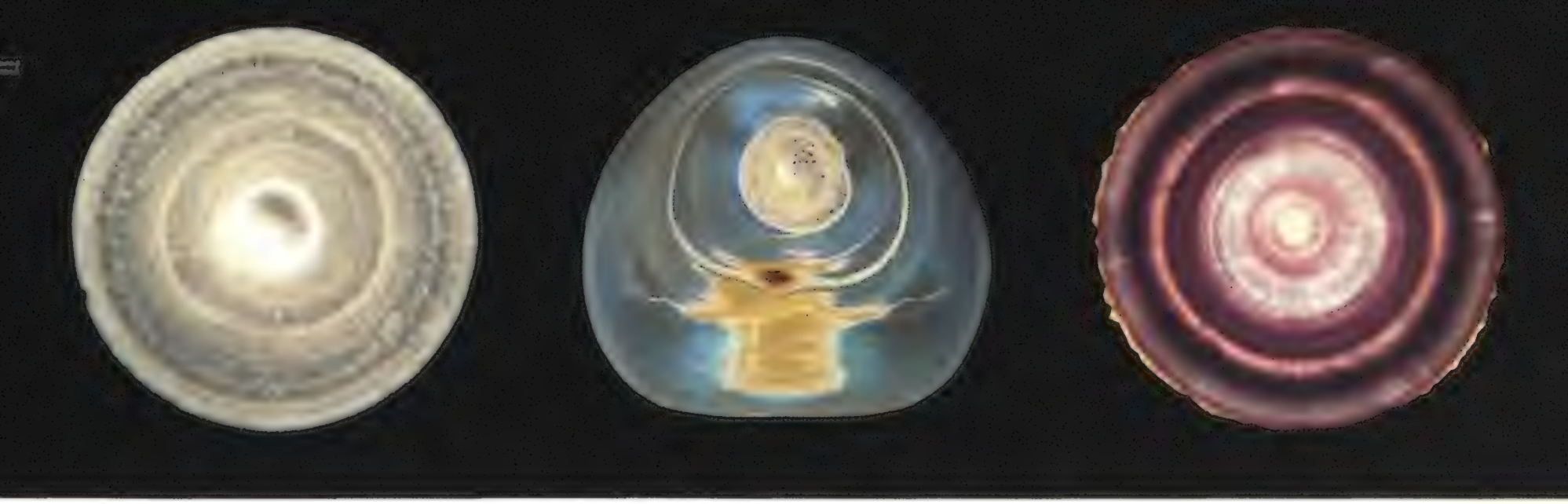
There are a number of ways technicians can analyze pearls to determine type and composition. From top, left: X-ray fluorescence causes freshwater pearl to glow uniformly; candling effect denotes thin coating of nacre on a cultured pearl; Lauegram pattern indicates presence of cultured pearl nucleus; X ray shows size of nucleus and thickness of coating; microsection provides structural profile of cultured pearl. Front: photo of cultured South Sea pearl.

Spats, spheres and surgical scalpels

For years, the oysters Japan used for culturing were collected by professional female divers known as *ama*. Goggled and wrapped in their traditional white cotton diving togs, the women gathered the mollusks from natural beds for transplanting to commercial operations. Now, the *ama* are no longer needed because the farmers raise their own oysters, starting with immature spats. When the bivalves grow into healthy adults at three years of age, they are removed from the water. A technician makes an incision in each oyster's flesh with a surgical scalpel, then carefully introduces a small square of mantle tissue cut from another living mollusk. Right next to this is placed the nucleus—a perfectly round sphere, ranging in diameter from about 2 to 8 mm (.1 to .32 inches), cut out of the shell of a mussel from the Mississippi River drainage area. The implanted oysters are then returned to the sea, ideally for two or three more years, in wire baskets suspended from wooden rafts or plastic buoys.

Within a few days, all being well, the inserted mantle tissue in each oyster will start to grow and envelop the nucleus. The nacreous material is actually secreted from this sac, and forms several layers every day. A finished pearl may well have 1,000 or more layers of nacre around the nucleus.

Much of the success or failure of the operation de-



The pearl's radiance derives not from its surface but from the interior. Microsections show up differences in layering of (from left) round and irregular saltwater pearls, and a freshwater mussel pearl. All are natural.

pends on the technicians. In Japan, they are usually women who exercise the skills of a surgeon with great dispatch; they can insert up to 1,000 nuclei per day. A misplacement will result in a poorly shaped pearl called a "baroque." The ideal, of course, is to produce a perfectly round "eight-way roller."

Once the oysters are suspended in the sea, there is still work to be done—periodically checking their health, moving them up or down in the water (and sometimes to new locations) to help maintain a reasonably constant temperature, and cleaning them. The sea itself needs to be unpolluted, with an adequate supply of plankton for feeding and a healthy current.

But despite all this care and attention, producing pearls is by no means a cut-and-dried operation. Many things can go wrong, including damage by typhoons, deadly "red tides" of plankton and other natural events. On average, only about 20 percent of the oysters produce high-quality pearls—and as many as 40 percent of the pearls fail to pass the Japanese government inspection that qualifies them for export.

Japan's system for merchandising its pearls is simple and efficient. The farmers sell their goods to Japanese middlemen at auctions in Tokyo and Kobe in December and January. Dealers from abroad must travel to Japan to buy from the exporters. Says Richard Reuter of the Cultured Pearl Association: "The only thing you are supposed to buy as a foreigner are graded pearls passed by the Japanese government."

The highly subjective work of grading, matching, drilling and stringing pearls is done by the Japanese processors. Pearls come in an almost infinite range of colors, from pink through silver, cream, gold, green and blue, to black. Pearl sorters must consider their color, luster, orient (the iridescent beams of color that play just below the surface), nacre thickness, roundness and spotting.

In general, the Japanese system for processing and selling pearls works well but there has been growing concern among some American dealers recently over a purported decline in gem quality. Always sensitive to changes in the market, many farmers are taking their oysters out of the water sooner in order to cash in on the huge American demand for inexpensive pearls. As a result, the thickness of the nacre on some pearls today has shrunk to .2 mm (.008 inch) compared with an average of from 1.5 to 2 mm (.06 to .08 inches) before World War II. Large numbers of these pearls are getting around Japan's inspection program and making their way into this country by devious means. One respected trade journal reports an enormous increase in U.S. pearl imports two years ago was "mostly comprised" of inferior goods.

Most pearls from other parts of the world are produced in close association with Japanese companies and sent to Japan for processing and export. There are exceptions to this rule, however. The Burmese government, for instance, auctions off its own South Sea pearls, together with several hundred lots of jade and other sumptuous stones, at an annual "gem emporium" in Rangoon. The six-day affair, which is by invitation only, takes place just after the Chinese New Year in the cavernous Inya Lake Hotel. Guards toting machine guns keep a watchful eye on the proceedings while more than 200 buyers examine the treasures displayed on tables set up in the hotel and on the grounds. The merchants scribble their secret bids on pieces of paper, which are then deposited in a silver bowl at the front of the auction room. The bidding is keen but the atmosphere seems surprisingly relaxed. Tea and sandwiches are served. Bidders have even been known to doze off between rounds. Jade is the primary attraction, but last year pearls accounted for more than half of the $4.5 million in total sales.

Burma's pearls are considered among the finest in the world; however, fewer top-quality gems are being produced there today (primarily because of pollution and illegal trafficking) and South Sea pearls are in in-

creasingly short supply elsewhere, too. Conversely, culturing of the so-called black pearl—it's actually bluish-black or dark gray—is booming. A black-pearl farming operation was established in French Polynesia in the mid-1970s by Salvador Assael, a well-known New York pearl importer, in partnership with a Frenchman, Jean-Claude Brouillet. Inaccessible except by private plane, their farm now produces some 20,000 to 30,000 marketable black pearls a year. These pearls, which are produced by the black-lipped oyster, fetch even higher prices than other cultured South Sea pearls.

When Kokichi Mikimoto launched his cultured pearls in London in 1919, at prices considerably lower than natural pearls, he created a sensation. Rising up in arms, dealers all over the world embarked on a campaign to denounce and discredit the imposters. They lost the battle for many reasons, the main one being that they were wrong. Claims to the contrary notwithstanding, a good cultured pearl *is* the genuine article. It's difficult for even an expert to tell the difference with the naked eye. The only way to be absolutely sure is to examine the pearls with X-ray techniques that reveal the presence of nuclei in the cultured specimens.

The cultured pearl's ascendancy does not mean that natural pearls have disappeared from the scene. Most of those that are still being bought and sold are antiques but a small quantity of new ones does come on the market each year. Many of these are bought by Arabs, but a number of American dealers specialize in natural pearls and more than $6 million worth were imported into this country in 1982 and 1983. The chances of finding a round pearl in a cultivated oyster range from one in ten to one in 50; with natural pearls, the odds lengthen to one or two per thousand. That's why a new natural pearl about the size of a pea retails for around $4,000, contrasted with $75 to $100 for a comparable cultured pearl.

It is often said that natural pearls hold their value forever, but that is not necessarily so. Pearl prices rose to dizzying heights in the early years of this century, only to collapse with the Depression. They never really recovered. In 1917, a New York socialite named May C. Plant traded a house on Fifth Avenue at 52nd Street to Cartier for a pearl necklace valued at $1 million. In 1957, after Mrs. Plant's death, the pearls fetched only $157,000 at an auction; by that time, the house was worth many millions of dollars.

Norman Parkinson

After Richard Burton gave *La Peregrina* to Elizabeth Taylor for Valentine's Day, her dog chewed on it.

The pearl that Richard bought for Liz

Or, take the case of one of the world's most famous pearls, *La Peregrina*, which was discovered in the Gulf of Panama in the 16th century and owned by various European royal families. In 1969, Richard Burton bought it at an auction as a Valentine's Day present for Elizabeth Taylor. *La Peregrina* was once described as flawless, but a dealer who saw it before the auction said that it had lost some of its luster. It lost even more after it disappeared in the shag carpet of Burton and Taylor's suite at Caesar's Palace in Las Vegas. The first thing the couple knew, Miss Taylor's dog was munching on it. The actress still owns *La Peregrina*, tooth marks and all, but its value today (Burton paid $37,000 for it) is thought to be mainly historical.

Pearly model of Mount Vernon is at National Museum of American History.

Nineteenth-century peacock brooch mixes pearls, rubies, diamonds and emeralds.

Rare pearls and diamonds in gold make this worth about $250,000.

Pearl from Alabama took the shape of a bird.

Art Nouveau brooch, c. 1900, features natural pink conch "pearls" and diamonds.

"Popcorn" pearl belongs to a collector in Indiana.

Pendant of Mississippi River pearls was made in 1930s.

Thai worker inspects half or "blister" pearls, which are cultured onto the shell rather than in the tissue.

Sometimes, though, natural pearls do hold and even improve their value. Van Cleef & Arpels currently has in its private collection a magnificent pear-shaped natural pearl mounted as a pendant (p. 40). It was once the property of the Earl of Dudley, and was auctioned at Christie's in London in 1902 for £13,500, which would be equivalent to nearly three-quarters of a million dollars today. Still in remarkable condition, it is one of the largest and finest natural pearls known to exist and its worth has increased dramatically.

When it comes to dealing with their Japanese competitors, American car and computer manufacturers have learned that imitation is the surest guarantee of success. That same lesson is about to be tested in the pearl business. Currently, most of the world's freshwater pearls—which are cultured in large mussels—come from Japan and China. Now, a new source is starting up in the United States.

For the past four years, the American Pearl Co., headquartered in Camden, Tennessee, has been cultivating freshwater mollusks commercially in three states: Tennessee, Louisiana and Texas. It is headed by John Latendresse, age 59, a collector of natural pearls and for 30 years owner of a firm that supplies mollusk shell from the Mississippi River region to Japan for processing as pearl nuclei. Despite a couple of natural disasters that wiped out many of its mollusks, the firm expects to conduct its first large-scale harvest this year.

When Latendresse let it be known early on that his company intended to sort and process its own pearls, representatives of the Japanese cultured pearl industry objected. They implored him to let *them* do both the processing and the exporting, as other non-Japanese producers have been wont to do. Latendresse refused. "But you don't understand," one of the Japanese businessmen explained. "This is part of our history. The whole cultured pearl business was our idea." To which Latendresse responded with considerable restraint: "Yes, but Henry Ford is part of our history and look what you folks have done with his idea."

Yet another breakthrough is looming on the cultured pearl horizon. Through genetic-engineering techniques now in the experimental stage, it may be possible to keep a piece of mantle tissue alive indefinitely in a test tube. With the addition of a nucleus to such tissue, pearls conceivably could be produced entirely in the laboratory. If this were to happen—and there is serious discussion of it in Japan—it would revolutionize pearling even more dramatically than the advent of commercial culturing 60-odd years ago.

Some of the pearls in an unsorted batch are more valuable than others but they all exude a regal glow.

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M O N I T O R

By Robert Wernick

The little prince who grew up to haunt Louis XIV

Scorned by the Sun King, wimpy Eugene of Savoy lived to become the greatest soldier in all Europe—and the scourge of France

Ein schmutziger, sehr debauchierter Bub—a dirty debauched kid—was the way the German-born Duchess of Orléans described young Prince Eugene of Savoy. All the gossip that reached the ears of King Louis XIV was equally malevolent. Eugene, they said, was hunchbacked and homosexual. He was stunted and sickly and ugly, his mouth always hung open, his nose was so small it was hardly more than two black holes in the middle of his face. He dressed sloppily. His family was in bad repute, too: his mother had been accused of poisoning her husband, and when she was given the choice of going to the Bastille and facing trial or fleeing the country, she had fled to Belgium. She was later accused of poisoning the Queen of Spain.

The king seems to have believed the gossip, for he decided that Eugene was a negligible little scamp. That was an error of judgment that would blight Louis' reign and change the map of Europe.

Eugene, born in 1663, was a distant relative of the king, through a junior branch of the royal family, the Bourbons. His first cousin was the Duke of Savoy, then a sovereign state straddling the frontier between France and Italy. His mother, Olympe Mancini, came of less exalted stock; her ancestors were Sicilian fishermen. But her uncle was Giulio Mazzarini, the sleek, sly adventurer who became Cardinal Mazarin, prime minister and ruler of France for nearly 20 tempestuous years in the middle of the 17th century. Once firmly in power, and secretly married it was said to the Queen Mother, he sent for a whole batch of nieces to be raised at the court in Paris and married off to the greatest nobles in the land.

Olympe was the most fiery-eyed and mischievous and sparkling of the nieces. The young king fell in love with her, but she had her Sicilian standards and would not let him into her bed. Eventually he permitted a highly advantageous match for her with Eugene Maurice de Savoie-Carignan, Count of Soissons, and she became one of the first of Louis' long line of mistresses. Until the Affair of the Poisons came up, she lived an extravagant life in Paris while her husband dutifully carried out military and diplomatic missions that kept him out of town most of the time.

Eugene was the fifth and last of the Soissons sons. With his frail constitution and unprepossessing appearance, he was not expected to amount to much, and at the age of nine he was earmarked for the church. The crown of his head was shaved and he was dressed in priest's clothes. But he dreamed only of battles and glory, and tucking up the skirts of his cassock over his spindly legs, he learned how to handle a sword and mount a horse, and steeled himself to endure all manner of physical hardship.

His big brothers picked on him

He studied Latin, mathematics and a little theology, but his main interest was strategy and the art of war. His big brothers picked on him. His mother barely had time to see him between the feasts and conspiracies and alchemical experiments. His only playmates were the lackeys and the maids, so he learned something of life from the servants' point of view—that is, he learned to keep his eyes open and his feelings to himself. His little black-draped form and sallow face ("plaguy yellow" according to Jonathan Swift, who saw him years later in London) flitted unnoticed on the fringes of the gaudy receptions, balls, concerts, plays, ballets, firework displays, card parties, gambling parties, amorous intrigues and political intrigues that filled the days and nights of a great lady like Olympe de Soissons. The king came often to her house, she knew how to keep him laughing, and little Eugene was smitten with a hero worship approaching idolatry for the resplendent, infinitely elegant young man who was pleased to be called the Sun King. But when he dared approach the presence to ask for a commission in the royal army, the king simply turned away, remarking that "nobody ever ventured to stare me in the face so insolently, like an angry sparrow hawk."

In an official portrait Eugene is backed by battle but looks mild and rides a most unbellicose horse.

Photographs by Erich Lessing

Eugene's first battle was the relief of Vienna from a Turkish siege in 1683, here painted in splendid detail by Franz Geffels. The Imperial army, composed partly of Saxon and Polish troops, sweeps down from the hills at left, and in the foreground fierce fighting swirls around the grand vizier's tent. But farther off Turkish cannon still bombard Vienna and Turkish troops still occupy trenches beneath the city walls.

The snub broke Eugene's heart and was to determine the course of his life. He vowed to leave his native land and only come back with sword in hand.

In the year 1683 there was no question as to where a hot-blooded 19-year-old should take that sword—to Vienna, the last outpost of Christendom against the Turks. For 150 years they had been a constant threat. By the 1680s they controlled most of what is now Greece, Yugoslavia and Hungary, and were laying siege to the Austrian capital itself. If the city fell, Muslim hordes would be loosed upon the heart of Europe. An international fervor that had not been

seen since the Crusades was driving young knights from all over the Continent to join the army that the Holy Roman Emperor Leopold I, having fled the city, was forming to lift the siege of his capital.

Louis XIV wanted no part of this crusade; though he styled himself the Most Christian King, he had an alliance with the Turks and would have been pleased to see them wipe out his hereditary enemies, the Hapsburg monarchs. When he heard that his own son-in-law, a young prince of the blood named Armand de Conti, and Conti's best friend, Eugene of Savoy, had dressed themselves as women and secretly ordered horses to take them east to enlist under the Hapsburg banner, the king's rage was boundless. His agents caught up with the young crusaders in Frankfurt and forced Conti to return to Paris. When asked what was to be done with Eugene, the king replied that it was a matter of no importance, and he was allowed to ride on.

He reached Leopold's army almost penniless, with nothing but his sword and a few letters of introduction. The emperor allowed him to enlist, and with his regiment he could look down on the great ring of gaily colored Turkish tents around the half-burned and half-starved city (left). With them he galloped down the Kahlenberg in the charge that broke the Turkish army and saved Vienna and the Western world.

Leopold was a dull, ineffectual ruler. He had sense enough, however, to recognize the value of the young recruit from Paris. At 20, Eugene was commanding a regiment, at 24 he had a cavalry brigade, at 29 he was a field marshal; from the age of 40 to the end of his long life he was commander in chief of all the Austrian armies. The house of Hapsburg had, by the force of circumstance, acquired for itself a genuine military genius, one whom Napoleon was to rank among the great generals of all time.

A Napoleonic eye for the lightning stroke

There is an unmistakable Napoleonic stamp on Eugene's campaigns, the same combination of charismatic leadership and painstaking attention to detail, the same eye for the lightning stroke that could change the course of battle. His greatest victories, at Turin against the French, at Zenta and Belgrade against the Turks, were won by surprise attacks.

Zenta, especially, showed his skill as a field commander and leader of men. When he took command of his army they were in a state of what he called "indescribable misery," ragged, hungry, undisciplined and unpaid. So little was expected of them, in fact, that Eugene had been urged to hold back and "to avoid getting involved in any action without a good chance of success." But after whipping his ragtag soldiery into a semblance of shape, Eugene caught the unwieldy army of Sultan Mustafa II about to cross the river Tisza. When the battle ended 20,000 Turks lay dead, some 10,000 had drowned and the rest fled, leaving behind three million piasters (about $7 million today), 9,000 baggage carts, 6,000 camels and the grand vizier's seal of office (p. 59).

Zenta was technically an act of insubordination, since Eugene was under orders to remain on the defensive, and there was talk of court-martialing him. But the arrival of the booty in Vienna—it included the sultan's harem and several tons of iron chains for bringing the captive Christian army back to the slave mar-

Cannon and painting of Turk surrender at Belgrade were part of exhibition at Vienna Army Museum.

kets of Constantinople—dramatized the fact that Eugene was a hero.

"You obey the rules of the art of war," Louis XIV petulantly wrote to one of his generals. "Prince Eugene doesn't give a fig for them, and you let him do what he wants." By 1701 what Eugene wanted was to lead an army of 30,000 men across the Alps through ravines "where not even a small cart had been seen before," and then outmaneuver, outbluff and outfight a French army of 50,000.

One of his feats during this campaign was to lead a patrol through a sewer into enemy headquarters in the city of Cremona and capture the French commander in chief, the Marquis de Villeroy, whom he had often seen in his boyhood: the marquis was one of his mother's lovers and her partner in spiritualistic séances. It was a brilliant feat but in a sense self-defeating, for the French army fought much better when it was rid of the incompetent Villeroy.

Like Napoleon, Eugene kept a strong rapport with his troops. They idolized their fiery little commander who always shared their hardships and dangers and worried about their well-being. Generals still led their men into battle in those days: Eugene's cuirass is on display at the Vienna Army Museum, pockmarked by scores of musket balls which struck him in battle. In 35 years of campaigning, he suffered 13 wounds.

He was Napoleonic, too, in his sense of order. He maintained a vast personal intelligence service throughout Europe and he took an intense interest in what is now called logistics. In the winter months when his fellow officers turned to gambling and whoring and the opera, he spent his days and nights trying to scrounge money and supplies for his men out of an Austrian bureaucracy that was as cumbersome and picayune and maddeningly inefficient in the 18th century as anything dreamed up by Franz Kafka in the 20th. When he went to Venice he was considered a freak, always visiting the arsenal instead of the beautiful courtesans along the Rialto; wits later called him Mars without Venus. Despite all his efforts, he could seldom get all the supplies he needed. Sometimes his men ate acorns.

As a result of Eugene's campaigns, the impoverished landlocked frontier state of Austria almost tripled in size. From 1683 to 1717 it absorbed Hungary, a chunk of Italy and the northern Balkans, becoming for the next two centuries one of the great powers of Europe.

When Eugene offered his sword to the Emperor Leopold in 1683, the House of Austria possessed great antiquity, great pretensions and little else. Leopold was called Holy Roman Emperor of the German Nation, but since there was no German nation, only 344 squabbling sovereign principalities and margravates, that title brought more prestige than power or revenue. What land he possessed had been acquired over the centuries more by skill in matchmaking than in combat. As the famous Latin hexameter put it, *Bella gerunt alii, Tu felix Austria nubes*: Others make war; You, happy Austria, marry. Happy Austria had rarely won a war before Eugene's day and was never to win a major one afterwards.

Austria, and England and all Europe, were saved from Louis XIV's territorial ambitions one day in 1704 when Eugene met the Duke of Marlborough at Mundelsheim in western Germany, and these two totally dissimilar great generals, the ruddy, flamboyant, lusty duke and the sallow, intensely private little prince, discovered that they could work together in perfect harmony.

It was a time when armies moved ponderously and campaigns resembled formal fixed patterns. Eugene, who believed in rapidity and surprise, made an

Robert Wernick, a frequent contributor to SMITHSONIAN, *has recently written about Babar and the influence of pepper on history.*

audacious proposal, to bring his and Marlborough's armies together by forced marches from opposite ends of Europe and throw them on the French where they were quietly encamped on the banks of the upper Danube. The result was Blenheim, one of the most decisive battles of the world, at which Louis' dreams of universal empire came tumbling down in a day. He had to spend the next ten years fighting to keep England and Austria out of the heart of France.

When the war was over, Eugene negotiated a favorable peace. It was so stable, in fact, that for most of the next two decades he was a civilian, helping run Austria's government. The loot from the sultan's tent at Zenta and the grand vizier's tent at Belgrade, along with gifts from grateful emperors, made him immensely rich. He was also immensely popular. Voltaire and Frederick the Great paid tribute to him as the first warrior and statesman of his age. Such a man, in the 18th century, owed it to himself to build a palace that would serve as emblem of his glory.

A supreme example of the Baroque

Eugene built many. But the most perfect expression of his taste and personality went up among vineyards on the Rennweg, a highway running just south of Vienna's city walls. It was on a rising slope of land affording magnificent views, hence the name that the Empress Maria Theresa later gave it, the Belvedere.

His architect was Johann Lucas von Hildebrandt, whom he had employed as surveyor and military engineer in his Italian campaigns. They started work early in the War of the Spanish Succession—Eugene would fire off recommendations to Hildebrandt in between orders to his generals and dispatches to his government—and they worked together for more than 20 years to produce a supreme example of Baroque architecture.

The Belvedere is a complex of two palaces and a great formal garden, and like all Baroque constructions it was designed to create a single overwhelming impression through an immense mass of varied, dramatic and often surprising details.

The lower palace, on the Rennweg, is fairly simple as palaces go, a place where the austerely military-minded prince could live. Only one room, the ceremonial hall in the center, is on a monumental scale, rising two stories high; its windows look out on the great sweep up the hill.

The gardens, designed by a pupil of Le Nôtre, who was responsible for the gardens at Vaux-le-Vicomte (SMITHSONIAN, August 1983) and Versailles, seemed to bring all Nature under the protective wing of the Prince of Savoy. There were scores of orange trees in pots and some 2,000 varieties of exotic plants

Sultan's seal of office, taken by Eugene at the battle of Zenta in 1697, is shown with treaty that resulted.

in commodious plots. There was a menagerie for the prince's ostriches and apes and bearded Transylvanian ox, for the eagle which he loved to feed and the lion that was to roar all during the night on which Eugene died. There were *bosquets*—trees and hedges planted to form roofless rooms, corridors, alcoves for intimate conversation. There were flowerbeds and lawns and trimmed box hedges, all in strict geometrical shapes; a steady stream of water poured down stepped cascades into pools dotted with statues of tritons and mermaids.

The upper palace was grandiose, complex, lavish, mainly used for formal ceremony. It was meant to be visited and admired. In the 18th century anyone respectably dressed could simply walk in and stroll about. There was very little furniture. People were expected to walk around as they do in a modern museum, to be dazzled and delighted at every turn by the stately proportions of the rooms, the gilded moldings, the glittering chandeliers, the crimson damask hangings, the varicolored marble walls, the ceiling paintings, the statues. On the walls was the prince's great

Despite his armor, Eugene's liege lord, Emperor Leopold I, was fonder of making music than war.

Lauros-Giraudon

Ablest ally in long war against French was John Churchill, England's famous Duke of Marlborough.

collection of art works by the Italian and Dutch masters; overhead were great swirling allegorical paintings in which Prince Eugene, Apollo, Hercules, Mars appear almost interchangeably.

The aim of Baroque architecture was to reflect in one complex image all the varied magnificence of God in a church, or a prince in a palace. Everything at the Belvedere, from the curves of the rooftops recalling the Turkish tents which Eugene had seen on so many battlefields, down through the gilded halls, the statue-crammed balustrades, the cascades, the Transylvanian ox, all are reflections of the owner's glory. The south facade of the Upper Belvedere, seeming to float between its reflection in the great trapezoidal pool and the heavens above, is an introduction to a world above mere mortality, like a congealed pageant celebrating the single theme of princely pride.

Winged figures and a miscreant Turk

On this scale pride can fade into hollow grandiloquence. Eugene himself was embarrassed by one particularly turgid piece of monumental sculpture he commissioned that shows him trampling a miscreant Turk while winged figures (Fame and assorted cherubs) flutter uncomfortably close around him. But there is nothing hollow about the Belvedere as a whole. Eugene after all had plenty to be proud of.

Forever shaped by the French court in which he was born and raised, he modeled himself on the French ideal of *l'honnête homme*, and probably came closer to it than any Frenchman of his generation. An *honnête homme* was not so much an "honest man" as a man equally at home in war and peace. He was loyal and truthful and generous, always even-tempered, polite, considerate of the feelings of others. He was cultivated and well informed and a patron of the arts. Eugene tried all his life to live out this ideal.

Physically brave as a matter of course, Eugene was a paladin on the battlefield, merciless to cowards and incompetents, generous to defeated enemies. A French diplomat in Vienna once described him as the only minister who could not be bribed. Eugene knew all about the ones who could be, though, and arranged that more than half of any bribe money be paid into a private fund for spying on the French—as well as the rest of Europe.

Like Louis XIV, but unlike most of the statesmen of his day, he worked hard at his job. The part of his correspondence that survives has been published in 22 volumes. He was also a voracious reader, and collected a library of 15,000 volumes, with most of which he had at least a nodding acquaintance. He kept agents busy buying paintings and prints all over Europe. His home was the center of whatever intellectual life Vienna had

Allegorical assumption into heaven of Prince Eugene of Savoy, painted in pastel colors on the Belvedere's ceiling, shows him (center, with baton) riding on a cloud accompanied by airborne gods and cupids.

to offer. He kept a full-time French poet in his household just to write odes in his honor and put him in touch with literary celebrities like Voltaire. He entertained the leading philosophers of Europe, Leibniz and Montesquieu.

And through it all he kept the calm, cool, secretive countenance he had learned to assume in his boyhood at the *Hôtel de Soissons*. An *honnête homme* might have fiery passions, but he knew how to subordinate them to his reason and his sense of propriety. "Love always appeared to Prince Eugene," said one of his early biographers, "as one of those frivolous emotions which reasonable men should never give way to. He used to say that in civil society those who were in love were like religious fanatics, people who were out of their mind." In his later years he did take a mistress, the Countess Batthyány; at least he used to go to her house every evening for dinner and cards and conversation. The horses knew the way, and the tale around Vienna was that by the time they arrived the aging prince and his aging coachman and aging guard were all sound asleep and had to be waked up by the countess' servants.

A Bavarian soldier who served under him when he routed the Turks at Belgrade in 1719 wrote a rousing ballad about it. Ever since, schoolchildren in German-speaking countries have learned to sing of the exploits of *Prinz Eugen, der edle Ritter*, the noble knight. Over the years the song made the displaced French courtier into a German national hero. German warships in both world wars were named *Prinz Eugen* (it is claimed that one of them blew up *HMS Hood* in the

last of the German naval victories in 1941), and the Third Reich gave the name to an SS division.

Eugene would have been horrified by this metamorphosis. He never thought of himself as an Austrian, let alone a German. He thought and spoke and wrote in French, and never even learned how to spell his name correctly in German. He came of the old international aristocracy that predated the rise of national states. His loyalties were personal, a matter of choice, rather than an accident of birth. He was loyal all his life to the Hapsburgs. No matter that Leopold was a lethargic dolt who took more pleasure in writing operas than in running a government; no matter that his son Charles VI used to scribble billets-doux during meetings of the Imperial War Council. The empire that Eugene helped build for them carried the banner of civilization. Central Europe, turned almost into a desert by centuries of Turkish depredations and religious wars, could now enter a long period of peace and relative prosperity. The light streaming through the multitudinous windows of the Belvedere, and bouncing off its creamy stucco walls, was intended to symbolize the awakening of all this corner of the world from a long night of misery.

Even in the 18th century, when national states were consolidating their power everywhere else, the Austrian empire that Eugene helped build was something of an anachronism, a hodgepodge of peoples speaking a dozen different languages. It lasted for two centuries and during most of that time generally was regarded as hopelessly backward and inefficient. Only after it was blown to pieces in World War I did the world begin to appreciate the scope and richness of its achievement in creating a cosmopolitan civilization in the unstable chaos-prone heart of Europe.

Time has not been unkind to Eugene's monument. His stupendous art collection was sold off at bargain prices by his niece Victoria in 1741 after the departure of her gold-digging husband, the Prince of Sachsen-Hildburghausen. Most of Eugene's paintings were acquired by his cousin the Duke of Savoy and are now in Turin; the rest are scattered in palaces and museums in Europe and America—minus a putative Titian and 37 others that the puritanical duke burned because his confessor found them lascivious. The interior of the Belvedere suffered when it was used as a barracks and even more in 1900 when Archduke Francis Ferdinand used it as a residence and redesigned it to suit his ideas of modern comfort. In 1945, Allied bombs blew holes in the walls and roofs.

But today, restored, it gleams and glitters as triumphantly as in Eugene's time. The upper palace is now a museum of modern Austrian art, something the prince might have had little sympathy for. He would, however, have been pleased, in his grave, quiet way, that the treaty which restored Austria's independence after its dark night of foreign occupation was signed by Britain, France, the United States and the Soviet Union in 1955 in the Marble Hall of the Upper Belvedere, under a vast and resplendent ceiling painting in which the prince sits enthroned, holding his field-marshal's baton, amid an admiring audience that includes Mars, Apollo, Fortitudo, Nobilitas, Consilium, Fama and Historia, with two ostriches and a hyena peeking out from the painted walls amid a gorgeous profusion of red marble and gold leaf.

Paolo Koch

The Belvedere, Eugene's fanciest palace, was designed by Johann von Hildebrandt and finished in 1724.

Martial mementos in Vienna include field marshal's baton, sword, cuirass often dented by musket balls.

EUGENIUS
VICTOR.
IN. ZENTA. Ampl697.
CARPI. 1701.
LUZZARA. 1702.
CREMONA. 1702.
SCHELLENBERG. 1704
HECHSTAET. 1704
VICTOR.
IN. TURIN. 1706.
OUDENARDE. 1708.
RUSSEL. 1708.
DORNICK. 1708.
PETERWARADEIN. 1716.
BELGRAD. 1717.

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By Walter Sullivan

Geologists add more pieces to a global jigsaw puzzle

Continents may not be single landmasses but crazy quilts of small fragments coming from widely scattered parts of the Earth

During the past few thousand years there have been three great revolutions in our understanding of the Earth. One was realization that the planet is round, demonstrated by the ancient Greeks but not widely accepted until after voyages of the great navigators. Another, likewise anticipated by the Greeks 22 centuries ago but not generally recognized until much later, was that the Earth circles the sun instead of being central to the universe.

The third such revolution is reaching its climax as evidence accumulates that the continents of today are not venerable landmasses but amalgams of other lands repeatedly broken up, juggled, rotated, scattered far and wide, then crunched together into new configurations like ice floes swept along the shore of a swift-flowing stream. It is a concept whose implications are still not fully realized, although elements of it date back to the long-disputed proposals of Alfred Wegener, who before World War I argued that the continents drift about like great barges.

After considerable modification this became the now largely accepted concept of "plate tectonics," explaining much of what is observed regarding our dynamic planet. Some oceans, such as the Atlantic, are being split apart, their opposing coasts carried away from one another at one or two inches per year as lava wells up along the line of separation to form new seafloor. Other oceans, such as the Pacific, are shrinking as seafloor descends under their fringing coastlines or offshore arcs of islands. The descending slabs generate earthquakes and volcanic eruptions, as in the Aleutians and Japan.

The Earth's crust, in this view, is divided into several immense plates that make up the continents and seafloors, and that all float on a hot, plastic, subterranean "mantle." What causes these plates to jostle each other, splitting apart or sliding under one another at their edges, is still a mystery to geologists: it may be friction from circulating rock in the Earth's mantle, or it may be an effect produced by gravity (SMITHSONIAN, January and February 1975).

Whatever the explanation, it is clear that the face of the Earth has had very different features in the past. Where the Atlantic is now expanding and the Pacific shrinking, there were once ancestral oceans playing opposite roles. And the landmasses we know today are the descendants of ancestral continents of very different aspect and location. About 250 million years ago, many of the Earth's primeval landmasses had come together to form a supercontinent, Pangaea. This eventually broke up again, splitting into a northern landmass called Laurasia and a southern one, Gondwanaland. Then, within the last 100 million years, these two vast continents further fragmented into the elements that now form the world we see on our map. This is the basic picture of geological change that became established along with the concept of plate tectonics.

Now, a radically new view has emerged, holding that North America and other continents were assembled from numerous and scattered alien fragments. Geologists refer to such continental fragments as "terranes" (as opposed to the more general term "terrain"). The first solid evidence for exotic terranes came from pioneering studies in western North America, which identified terranes in lands from California to Alaska. These lands, originally island arcs and continental fragments, may have been as far distant as Tahiti and

New view of continents' formation suggests a puzzle where pieces of diverse origin drift and recombine.

Illustrations by Laszlo Kubinyi

Peru. A similar mosaic picture has been emerging in studies of eastern North America as well.

A group of leading French and Chinese scientists recently presented striking new evidence for this scenario, after three years of exploration in Tibet. They had identified four east-west "sutures" where separate pieces of landscape, at intervals of millions of years, had been swept against the underbelly of Asia. South-central Tibet, site of the capital city of Lhasa, they said, appears to be part of a vanished continent, fragments of which may also be part of California.

The process that has assembled Asia, marked by recurrent earthquakes, is continuing. India is pressing northward, crushing the landscape at a rate of two inches per year, producing the world's highest mountains, whose peaks thrust ever higher into the sky. Fossils in rocks of that region show that India and Tibet are divided into at least three distinctive landscapes that have come from widely scattered regions. More exotic terranes presumably lie north of Tibet in central Asia. This is a major shift from the plate tectonic view of the Himalayas as the product of a single collision between one northward-drifting landmass—India—and the Asian continent.

It now appears, said the French and Chinese scientists, that Asia "actually results from the juxtaposition of many blocks of diverse origins." It is, they added, a "continental mosaic." What these scientists saw in Tibet is akin to what other geologists have been finding in western North America.

The history of collisions that assembled the West Coast, according to the terranes theory, is so extra-

Appalachian ridges are vestiges of mountains raised as fragments of Gondwanaland crushed East Coast. More recently, Susquehanna River cut across ridges to form a series of water gaps upstream of Harrisburg.

ordinary that, until recently, many geologists found it hard to believe. When in the 1950s Warren Hamilton of the U.S. Geological Survey was working in the mountains of western Idaho, he saw rocks strikingly like those of the Aleutians. He suggested then that this region, 350 miles inland, had once been an arc of volcanic islands. But, as he puts it now, "I lacked the guts then to speculate in print on *how* the rocks got attached to Idaho." By now, however, the basic picture is more readily accepted, although many skeptics still find it hard to accept the most extreme claims—for example, that California alone is made up of some 50 different fragments of diverse origin.

A key piece of evidence for terrane theory was the discovery, in certain parcels of western landscape, of tiny fossils known as fusulinids. These belonged to species that some 300 million years ago were native to tropical waters fringing lands that now form southern China and southeast Asia. They bore no close relationship to similar families then living in Texas, Nevada and Kansas. It now appears that much, if not all, of the region west of a zone from Idaho to southern California is formed of bits and pieces of landscape swept up as North America overrode a vast ocean floor whose western remnant is the Pacific Ocean. The process was at times continuous, like a conveyor belt, at other times halting and sporadic. Mountain ranges and a mosaic of terranes in western North America were the result. Some of that motion continues as the rim of California, from San Francisco south, is dragged northwest—chiefly along the San Andreas Fault—and as similar motions occur along the coast of southeast Alaska.

The evidence shows that some terranes, such as one forming part of Marin County in California, were created in mid-ocean, far from any source of continental sediment. The Wrangellia terrane that towers as the Wrangell Mountains of Alaska and forms the walls of Hells Canyon on the western border of Idaho seems to have originated more than 300 million years ago as a mid-ocean arc of tropical volcanic islands like Tahiti and its neighbors. The arc's remnants are now scattered along 1,200 miles of the West Coast.

An equally remarkable picture has been developed by geologists studying eastern North America. Although the East Coast terranes seem to be much older than those in the West, the evidence for them has turned up more recently. A key discovery came in 1982 when Sara L. Samson, a graduate student in geology at the University of South Carolina, took a field trip in the region known as the Carolina Slate Belt which runs from Virginia to Georgia. Near Batesburg, Virginia, she stooped to tie her shoe and noticed a small stone with a curious imprint. Samson retrieved the stone and took it to Donald T. Secor, a professor of geology at the university.

He recognized it as a fossil trilobite that had been native not to American shores but to a region far across an ancient sea. Trilobites, now extinct, resembled modern pill bugs or horseshoe crabs. They were among the earliest forms of multicellular life and proliferated into thousands of species. Two trilobite fossils suspected of being "un-American" had already been found in the Carolina Slate Belt, but they were fragmentary and their identification was ambiguous. Samson's discovery, followed by many more in the same area, was the clincher (p. 70). That long slice of the East Coast was not native to America.

Furthermore, other geologists had found the composition of the Slate Belt similar to the type of deposits produced by eruptions along volcanic island arcs (a modern example is the Aleutian chain). It is now be-

Tortured rock rims of Hells Canyon in Idaho, part of Wrangellia terrane, came from equatorial Pacific.

Walter Sullivan, a New York Times *science editor, is author of* Landprints: On the Magnificent American Landscape, *published in November by Times Books.*

lieved that the Slate Belt was once just such a chain of volcanoes, located in an ancient ocean perhaps as far away as the present site of Africa or southern Europe.

Similar accretions of foreign terranes hundreds of millions of years old seem to have occurred farther north, and alien trilobites similar to those recently found in the Slate Belt have been known for years along the eastern rim of New England. The evidence of these fossils suggested to geologists that the rocks of southeastern New England were transported there from hundreds—or even thousands—of miles away. The fossils were driven against the continent by lands that collided with it as the earlier Atlantic Ocean was snuffed out and the coast squashed, producing mountains perhaps as tall as the Himalayas. The roots of those mountains survive in the rocks and granites of New England. Their mineral assemblages show that they formed under the weight of an enormous mass.

Fragments of fossil trilobites native to Europe were a clue to origin of this rock from Carolina Slate Belt.

As lands from the far side of the closing ocean—Africa and Europe—drew near, the coastal zone farther south was also crushed, forming the Blue Ridge and, ultimately, the remarkably uniform Appalachian ridges whose machinelike regularity astonishes air travelers. Because the original folding occurred several hundred million years ago, erosion has removed the upper parts of the original folds, leaving ridges formed of the most resistant rock and valleys cut where the rock was soft, such as the limestone in the floor of the Shenandoah Valley. The remarkable regularity of the original folds persists, but as the landscape was etched deeper and deeper some valleys became ridges and some ridges gave way to valleys. Meanwhile, relatively young rivers—only a few million years old, such as the Susquehanna—had cut across the ridge system, forming a succession of water gaps like those upstream from Harrisburg, Pennsylvania (p. 68).

Fossils and folds are not the only evidence that Florida, parts of Newfoundland, Nova Scotia and coastal New England, as well as numerous West Coast terranes, are "foreign." The analysis of magnetism frozen into their bedrock has also supported this conclusion. When rocks cool below a critical temperature, they capture the alignment of the Earth's magnetic field in existence at that place and time. It is the Earth's magnetism that causes a compass needle to point toward the North Magnetic Pole and, when a rock cools after eruption or other extreme heating, it in effect becomes imprinted with countless compass needles. Later analysis of the rock can reveal the magnetic alignment inscribed in it when and where the rock was first formed. Elapsed time since the rock cooled can be determined from the extent to which certain radioactive decay processes within it have run their course.

These two bits of information—magnetic orientation and age—tell the specialist where that bedrock lay, relative to the magnetic poles, at the time of its birth. Such measurements have shown that world geography has changed radically. Analysis of rock samples from Europe, Africa and the Americas, for example, has documented the slow pulling apart of those lands to form the modern Atlantic.

Was Newfoundland's coast once off Georgia?

Perhaps the most controversial hypothesis to come from these analyses is the proposition that 380 million years ago the coastal region from Newfoundland to easternmost Connecticut, before becoming welded onto North America, lay off Georgia. Only during the last stage in assembly of the continent was it shoved 1,000 miles north to its present position.

In New England, geologists believe they have seen

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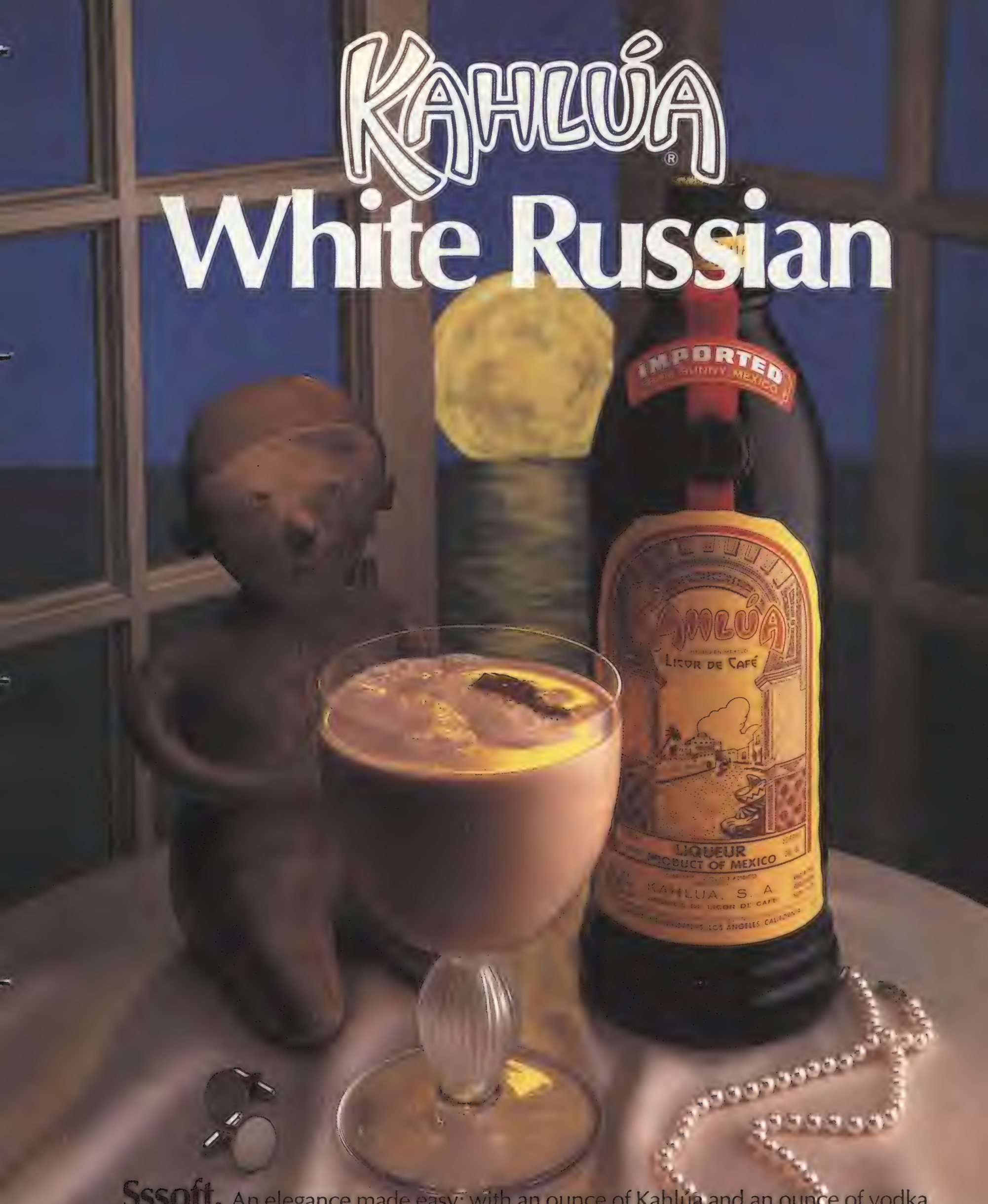

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A 500-million-year-old match-up, the fossil trilobite at left was found in Newfoundland, the one above was unearthed in Europe. Both, as well as specimens on page 70, belong to the same genus and time.

the faults where this long sliver of land became welded onto the continent—faults no longer active in the manner of California's San Andreas Fault. They include the Clinton-Newbury Fault, which roughly follows Interstate 495 as it circles the outer suburbs of Boston, and continues south as the Lake Char Fault, entering Connecticut along Route 52, which becomes the Connecticut Turnpike. Rock tortured into jelly-roll configurations by collision or sliding is evident in road cuts near the state line. From the fossil and paleomagnetic evidence it seems clear that all land to the east is alien, but because of conflicting data, a number of geologists are reluctant to believe it was shoved so far north during what was the final stage in closure of the ocean ancestral to the Atlantic.

The shove responsible for the shift, however, could have come from a part of the giant continent, Gondwanaland, which included Africa and South America as well as parts of what is now our East Coast. After Gondwanaland split up, according to one theory, one part attached to Africa further fragmented into western and southern Europe. Fossils similar to those found in South Carolina and southeastern New England are also found in parts of Spain, France, southern Great Britain and northwest Africa.

It was Gondwanaland's great shove from the south that, in addition, probably glued Florida and southern Georgia—then part of Africa—onto our continent. Holes drilled through the deep sediment that covers the Georgia-Florida border area have penetrated rock formed 350 to 450 million years ago that contains fossils of African affinity. Furthermore, the magnetism in specimens from South America suggests that that continent (still presumably mated with Africa) was moving steadily north toward an encounter with North America. If so, the resulting collision would also ac-

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count for the severe crumpling of the landscape across southeastern Oklahoma and west-central Arkansas—an upheaval that survives as the Ouachita Mountains.

If North America gained Florida by delivery from the south, it may then have "lost" Yucatán. In 1982 John F. Dewey and James Pindell, then at the State University of New York at Albany, proposed that during the collision Yucatán, as a separate terrane of the Earth's crust, was shoved like a wedge between Alabama and Texas. Then, during opening of the Gulf of Mexico about 150 million years ago, Yucatán withdrew and became part of Central America, leaving behind the lower Mississippi Valley. If the Dewey-Pindell proposal is correct, there was a time when dinosaurs could have walked from Florida to Texas across what became the land of the Maya.

As geologists reconstruct the ways in which this and other continents have been assembled, torn apart and reassembled, they are also tempted to look ahead and predict future geographic revolutions. They suspect, for example, that Australia will smash into Indonesia and push those islands north, adding them to the continent of Asia. Europe and Africa will converge, closing off the Mediterranean Sea between them and perhaps throwing up new mountain chains as high as the Himalayas. In the Pacific, island arcs such as Japan, the Kuriles, the Kamchatka Peninsula and the Aleutians will move to distant locations—but because plate motions in the Pacific are so complex, geologists cannot predict where they will end up. And the sliver of California coast west of the San Andreas Fault will slip northwest, separate from the continent and ultimately collide with Alaska.

There will be no early need, however, for cartographers to revise their maps. The changes will take place over millions of years. One hopes that the human race will survive long enough to compile a detailed record of such changes and their by-products.

Terranes and their origins, illustrated by matching shapes on this artist's map, pose a continuing, unsolved jigsaw puzzle for geologists. For example, similarities between the Aleutians and western Idaho suggest a common origin of these pieces, as is the case with Japan and a part of California. Other parts of California may have moved there from fragments originating in southern China and the south Pacific. On the East Coast, parts of Georgia and southern Florida appear to have come from an ancient continental landmass as it split into Africa and South America; while fragments of North Carolina, New England and Newfoundland share common origins with parts of Europe. The Yucatán, it appears, may have been stolen from the Gulf Coast region between Alabama and Texas.

Photo courtesy of NASA

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By David Nevin

Revered and reviled, Minnesota's wolves are in trouble again

They're protected by law but they're preying on livestock and a proposal to trap them has angry conservationists howling in protest

Opposite: Motivated by curiosity, not hunger, two wary wolves size up a visitor at wintry Minnesota refuge.

State bounty hunters dispatched animals above in the 1960s, before species was declared endangered.

It was late, summer dusk settling on the northern Minnesota woods, mosquitoes emerging in earnest, the woods wet after a rain. We were on an old logging road, long out of use. David Mech gestured toward a narrow place on the road. "Step *over*," he said. "Wolf trap." The iron trap was buried, all sign of its placing removed. I shook my head, surprised, and the lads with us, Mech's field assistants who had set the trapline, looked pleased.

Mech is a research biologist, U.S. Fish and Wildlife Service, author of a fine book, *The Wolf*; probably he knows more about wolves than anyone in the world. We were walking a trapline in the heart of the last large viable population of Eastern timber wolves left in the contiguous United States. They were out there in the gathering darkness. We knew that. Some were wearing radio collars, animals previously trapped in Mech's long and continuing study, collared and released unharmed. Their batteries would be exhausted soon and he wanted to trap them again, tranquilize them, examine and re-collar them. But wolves are wily and usually avoid the most invisible of traps, and so it was this night.

We were off the road by now to avoid leaving scent by the traps; the underbrush among birch and aspens soaked us to the waist. Blueberries the size of peas were newly ripe and the boys scooped handfuls as they passed. Bear food. Mech stopped, trained a hand antenna, switched a receiver to various wolf frequencies and awaited the telltale click: nothing.

Why controversy dogs the big, bad wolf

Researcher examines wolf tracks on the snow in the wilds of the Superior National Forest near Ely.

"Clever," he said, whisper as light as the sawing of mosquitoes, "clever, clever animals." His respect for the wolf is unbounded. He's a big man with a beard, bald at 47; he pronounces his name to rhyme with reach. "Let's see if we can call 'em up."

His hands went to his face and he bent slightly, taking deep breaths, chest heaving, shoulders moving; he looked larger, somehow—changed. Then he threw back his head and the howl burst out, low at first and then breaking into a high bell-like note that gradually died out. It was majestic, brilliant there in the Minnesota dusk, and not at all human. He caught breath and went again, striking a mid note, then high, then low, and again, starting high, a pealing, soaring note that deepened to lower register, thoughtful and inviting.

I recognized the sound on the first howl. I'd heard wolves only on recordings at the superb wolf exhibit assembled by the Science Museum of Minnesota in St. Paul, but the recognition was deeper than that. It went far back, it flowed from that pool of inherited knowledge we all carry from the primeval past. I'd have known it anywhere.

We waited, listening for an answer. Wolves howl to announce themselves, to assert territorial claims, to call meetings. They answer howls and often come to investigate. But are they fooled by a human howling? Clever animal like that? "I don't know," Mech had said earlier. "I think so. They'll answer, anyway, and they'll come—did last week on this same line."

A red squirrel chirped close by. A jet aircraft was high overhead, its distant roar intrusive and out of place. Mosquitoes whined. Silently one of the boys handed me a vial of repellent. Mech howled again and stood expectant, radiating an inner excitement. His fourth howling had a new, plaintive note at lower register, lonely, sad, appealing. Was this my own anthropomorphic coloring? I don't know and later Mech couldn't say. But this lower cry produced an answer.

Joined by strands of fragile sound

It was a single howl, quavery and breaking, a mature animal perhaps a mile way. Mech responded with new enthusiasm, a high note with quavers, dropping off until it was eerily low and seemed full of charged meaning. It was a beautiful sound, inhuman, and from the gloom came multiple answers, wolf talk cast through the woods, high peals breaking down to throaty bells that I thought must be the voices of mature wolves. The woods seemed alive—we were points on a grid map, joined to the animals by strands of fragile sound.

Ten times Mech howled and by the last the clamor in the distance had passed and no animal had approached. He trained the antenna, but the receiver was

Biologist David Mech, the country's premier wolf researcher, "calls up" creatures by howling at them.

Wolves often answer him. They howl to call meetings, claim territory or simply to announce their presence.

silent; the collared wolves were still out of range. "Pups, I think," he said. "At a rendezvous site." When a litter is several weeks old, parents move it to a clearing and go off to hunt. The pups play, hunt mice, learn and wait for the pack to return with food. "They'll make themselves sound like adults when they're left alone and they hear another wolf."

We turned to go—and there, just clearing the trees, was a perfect full moon. Of course the wolves were howling—*they howl at the moon*! The lad next to me was watching my face in the pale, flooding light. He shook his head, grinning. "Folktale," he said. "Moon hasn't anything to do with it."

Folktale. When you think about wolves, you don't really think biology—you think folklore. The wolf is indigenous above 15 degrees north latitude all the way around and he has always fascinated us. He turns up in the earliest tales, legends, myths. Aesop was talking about him 2,500 years ago. He appears in many cultures and in every age, in Paleolithic drawings, in Tlingit ceremonies on the Alaskan coast, in France and Russia and Japan, as friend and enemy, as good and evil, as wise and foolish, and most of all, as a sort of parallel, a fellow hunter, fellow being, brother. As we walked back through the dark woods, moonlight glittering on wet aspen leaves, I thought that of all the reasons the wolf—and his survival—may be important, that is the most compelling: he goes to our roots, he was with us before memory.

We knew the wolves were in the woods that evening because we had located them earlier from the air, the Cessna 172 with twin antennas lashed to its struts turning in tight circles, buffeted by the edge of a summer thunderstorm. In the winter when the trees are bare and the wolves dark against snow it is easy to see them, but now they were hidden in foliage. Mech switched his receiver from left antenna to right, tracking the radio collars until we were over a pair. They were there, all right. It seemed ironic that they should be so obscure in the flesh when they're so prominent in the political arena and the courtroom these days. Down in Minneapolis and in Washington, men in three-piece suits argue endlessly over the future of this fascinating, intelligent, highly social animal slipping through the north woods. Probably it is characteristically human that these arguments often seem to have little to do with the wolf itself. "You gotta understand," the activist said, fixing me with a stare, "when you're writing about wolves, you're not writing biology, you're writing politics."

It has been that way with the wolf for a long time. The latest scenario began with the Department of Interior's plan to turn over control of the animals to Minnesota, which led to Minnesota's bid to resume sport trapping of the wolf, which precipitated a lawsuit to halt it all, and a judge's angry concurrence. The issue is momentarily frozen now but bound for still more courtroom challenges.

Just what—who—is the animal that is producing all of this controversy? It is *the* large predator of the hemisphere, matched in weight and power only by the large bears and cats that always were much scarcer. Indeed, the wolf is almost the only wild predator that most of the nation's moose, elk and even deer need fear. But myth and the aura of power and evil associated with wolves have exaggerated its size. The lar-

David Nevin's historical novel, Dream West, *was published last year by Putnam. He is now at work on another book about the antebellum West.*

gest on record weighed 172 pounds but males normally weigh 95 to 100 pounds, females 80 to 85 pounds. They may stand three feet at the shoulder, their color may range from white through cream, buff, tawny, reddish and gray to jet black, their fur is inches deep in winter, their teeth are fully as large as folktales assure us, their jaws powerful enough to crack bones for the marrow.

Their feet are huge (their track is a good four inches across) and their legs long and thin, giving them an awkward look when still but making them powerful travelers even in deep snow. They are rangers, covering a huge territory, taking game by scent and by tracking, but more often by chance encounter, and 30 miles and more a day is not uncommon. Certain wolves are known to have roamed as far as 600 miles from their home territory. That stamina, that stoical capacity to trot at a steady pace for hours and hours in a search for prey, was key to the American Indian vision of the wolf as a hunter rival to be admired and emulated.

Our image of the wolf is one of violence, ferocity, danger. The wolf kills to eat and unlike human hunters doesn't care whether its prey is dead before it begins to feed, and this horrifies some people. There is no hard evidence, however, to support rumors that wolves have killed Eskimos and Indians. Indeed, the animal's basic posture toward people is surprisingly submissive. Every biologist who has worked seriously with wolves has remarked on this. Wolves have a fundamental fear of men and have allowed their pups to be carried off, sometimes following for miles, whining piteously but unwilling to attack.

The wolf is an intensely social animal within its own pack which, with up to 12 members or so, is essential for hunting moose and other large prey. Each pack is built around a dominant male and female and these animals may sometimes mate for life. Their dominance is established within their respective litters as pups, and inferior animals learn to accept their position and demonstrate it often with deferential gestures and motions familiar to anyone who has watched dogs dealing with humans. As the pups grow they depend on all members of the pack, indiscriminately demanding food by nuzzling any adult's muzzle. The adult obligingly regurgitates a meal (the only means of carrying it home) and the lesson is clear—the pack is family.

Lone wolf pauses near beaver dam. Beavers invite an attack when they forage for food in early spring.

Even wolves are reluctant to leave home

But breeding within the pack usually is limited to the dominant pair, and as pups grow to adulthood or other wolves arrive, they may stay with the pack only by accepting this restriction and demonstrating obeisance frequently. Those unwilling to accept it—those with dominant traits—drift off and if they're lucky and they find mates and things go well, form a new pack. Some dispersing animals leave and return several times, like human youngsters getting up enough nerve to leave home.

The wolf is relentless in its search for food, and this means that the real issue of its survival is habitat. So long as ungulate herds, beavers, rabbits and smaller prey animals fill the woods, wolves thrive. When North America was thinly populated with roving bands of huntsmen, the wolf was just about everywhere. But when agricultural man displaced wilderness and wildlife with fields and herds, wolves turned to domestic animals and at this point in every culture the human view of the wolf shifts from light to dark.

American settlers converting forests and plains to agriculture came into direct conflict with wolves. Stories of the Old West are full of wolves as evil, malevolent, dangerous, often with supernatural powers, and always as a fundamental enemy of man. Wolf bounties were common and extermination was so vigorous that within the contiguous United States today wolves survive in numbers only in northern Minnesota, where an estimated 1,000 to 1,200 roam the isolated woods. Wolves seem to be staging something of a comeback in Wisconsin, where there may be as many as 30. A few live around Glacier National Park in northern Montana, and several wolves have been seen deep in the central Idaho mountains.

There are about 50,000 wolves in Canada and another 10,000 or so in Alaska, where state game department officials are so confident of the species' status that they sometimes thin out wolf populations to relieve predator pressure on game animals coveted by hunters.

Captive pack maintained for study by Mech feeds on white-tailed deer carcass. Male baring its teeth (left) and white female (right) are the dominant pair. As such, they choose feeding positions while rest compete.

Just last November, in fact, more than 100 wolves near Fairbanks were slated to be shot from airplanes and helicopters by department employees. Such an operation would be illegal in the lower 48, where the wolf is protected under the Endangered Species Act—and that's where the political trouble begins. Protection of wolves is still a hard lump to swallow for many Americans living close to the land.

The act became federal law in 1974, recognizing that man's accelerating impact on the environment was wiping out whole species at an appalling rate. It mandated total protection of species considered in risk of extinction and limited protection for those threatened. Killing an endangered animal for any reason other than bodily protection was forbidden; threatened animals could be "taken"—the favored euphemism—only under specific conditions.

When this landmark legislation went into effect, the Interior Department's Fish and Wildlife Service ordered Minnesota to cease its wolf-control program. The state reacted sharply to the federal government's usurpation of its control over what it regarded partly as a pest and partly as a trophy animal. Minnesota's Department of Natural Resources orients to a large hunting constituency and to the political voice of farmers who see wolves mainly as potential predators on their flocks and herds. And the trouble with endangered status for an animal some 1,200 strong that did occasionally prey on livestock was that any killing of it was illegal even if a farmer found it in his sheep pasture. The illogic of this produced much righteous outrage in Minnesota and illegal wolf kills bounded up. No jury of a northern Minnesotan's peers would be likely to convict him for such a crime.

In 1977, the FWS reduced the wolf's status from endangered to threatened, which meant that problem animals could legally be killed by government officials. But the Fund for Animals in the person of Brian O'Neill, a tough young Minneapolis lawyer, hauled the FWS into federal court and there District Judge Miles Lord, noted for his outspoken decisions in support of the environment, laid down strict rules under which wolves could be taken. Since then no more than 42 wolves a year have been taken by depredation-control trapping, livestock losses have been modest, the number of wolves killed illegally or by accident continues at perhaps 250 a year and the wolf population has remained stable. In other words, a reasonable

Picture from traveling exhibit of the Science Museum of Minnesota shows how old tale stereotyped wolf.

Not long ago, a captive-bred wolf weighing 75 pounds created quite a stir at a school in Chisholm, Minnesota.

biological balance seems to be holding. Trouble is, this is a political, not a biological, issue.

The Endangered Species Act requires not just protection of a dwindling species but action to recover it until it no longer is threatened. Teams of specialists are formed for each species; a wolf team was set up in Minnesota and another was established in Montana for the northern Rocky Mountains. The western situation is different, since wolves there have been almost completely wiped out. That team recommended three zones in which recovery might be possible. One is in the Glacier National Park area where packs may expand if the animals there are protected. Another possibility is in Yellowstone National Park where wolves have been exterminated. The third is in central Idaho where that handful of wolves holds on.

One way to return a substantial wolf population to Yellowstone and Idaho would be to capture the animals elsewhere and relocate them, an idea that infuriates local stockmen. John Faulkner, an Idaho sheepman who is a member of the wolf recovery team, says bluntly that repopulation will never succeed politically in the West until the federal government agrees to reimburse farmers and ranchers for their losses to wolves. The government resists this, seeing it as a precedent for getting stuck with predator losses in general. But Faulkner says, "If the people of the United States have decided this animal warrants protection, they shouldn't expect individual stockmen to pay for that policy."

There seems no real chance that repopulation efforts will begin in the West anytime soon. Witness the recent testimony of Ray Arnett, a former Assistant Secretary of Interior: "We have made that policy very clear that there was going to be no introduction of the wolf into Yellowstone at this time." That makes all the more valuable those 1,200 wolves in Minnesota, a stable and entirely viable population. Indeed, the lonely woods supporting those wolves amount to a huge laboratory that makes possible Mech's work, which certainly is the most elaborate and important wolf study in the world. Durward Allen's study of the wolves on Isle Royale in Lake Superior is longer lasting (Mech began there as a graduate student, just as so many of today's wolf biologists began as grad students under him) but Isle Royale has only a comparative handful of wolves to watch.

Given the importance of this last major colony, it was shocking to many wolf lovers when, in 1978, the

The youngsters could see for themselves that it bore no resemblance to villain in Little Red Riding Hood.

Minnesota recovery team, of which Mech is a member, proposed that a certain number of animals be taken each year. The disconcerting idea that killing scarce creatures will help them recover is essentially a matter of public relations. If sportsmen are allowed to trap the wolf, perhaps the animals will have more value in the eyes of Minnesotans and hence there will be less resistance to their protected status and fewer illegal kills. Mech's position is that a limited take won't hurt the species biologically and may help it politically.

The recovery team's report didn't matter much in 1978, since the law plainly said you couldn't have a season on threatened animals. In 1980 Minnesota made another appeal to the FWS to give it control of the wolf, with a sport-trapping season as a condition. Once again, FWS said no. Then, under a new administration, Minnesota received an invitation from the reconstituted FWS to reapply. Soon, the FWS issued new regulations surrendering control and immediately Minnesota proposed a trapping season.

Then the scrappy Brian O'Neill, now representing Defenders of Wildlife, the Sierra Club and other conservation groups, hurried back to court. Judge Lord, who is very low on Interior's popularity list, noted that the law would allow a sport season on a threatened species only in the extraordinary case of its population having grown so sharply as to exceed the carrying capacity of a particular area. Had wolves experienced such growth? The FWS said no and Lord ruled the new regs illegal. To a lay person the law seems fully as clear as the judge finds it, but Interior's lawyers have a different interpretation and continue to battle.

Many of the people who live with wolves have attitudes radically different from those of O'Neill and the organizations he represents. "Environmentalists don't make their living in the environment—maybe from it, but not in it," said the Idaho sheepman, John Faulkner. I asked him if the wolf should be recovered. He hesitated, then grinned and said, "No. If they want to see wolves, let 'em go to Alaska. There're plenty there."

Drive up to Isabella, a tiny town in northern Minnesota's lake country, and you'll find that everyone is familiar with wolves. They've lived with them all their lives and believe they know them well, though actually their attitudes seem to be conditioned more by mythology than by science. Even so wolves apparently are killing dogs there. Deputy Sheriff Larry Byrnes told of a chained dog taken from a yard, chain and all. Byrnes tracked the animal and a quarter mile off found hair and blood. The carcass, with the chain, was gone.

Dogs and wolves don't like each other a bit and it's well known that wolves will eat dogs. "I saw this

It may look like this mother is biting her days-old pup but she's only moving it—and very gently, at that.

big, black, healthy-looking sucker—I mean, a *wolf*—eight feet from my bedroom window," said a young woman named Kelly Spina. "My dog was out there going crazy and so I hollered at it and I heard this growl and there he was. My three-and-a-half-year-old boy plays in that yard—what's to keep a wolf from coming after him? You think I'm not scared?"

A hundred miles away, a 67-year-old farmer with a strong, steady face told me, "I had one in the pasture last night. Come on, I'll show you." Emil Radaich drove his pickup slowly across the 1,200 acres he and his son work alongside a paper-company forest near Goodland, Minnesota. The wolves live in the forest and come out to prowl his pastures. "There. See?—he was following a deer." You could see the cloven deer print and with it the huge wolf paw, four inches across, claws clearly defined. The ground was soft and the prints were deep. It was easy to picture the big animal moving through the pasture full of implacable purpose. "If the people of the United States want my farm for a game preserve," Radaich said plaintively, "seems like they ought to be willing to pay me for my stock losses." In fact, the state does pay for proven wolf losses, with figures showing how modest it all is: in any given year, less than 30 farmers will have losses.

And up in Babbitt, Minnesota, where hunters gather in the filling station to swap stories, Art Erkkila put it this way: "Wolves ain't no good—never was, never will be. They oughta round 'em up and ship 'em all to Minneapolis. They love 'em down there."

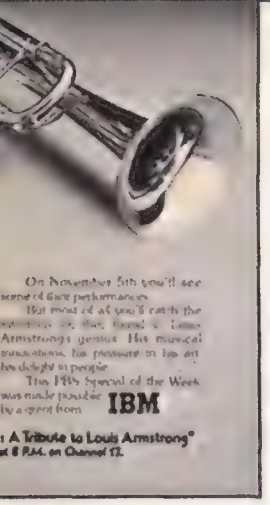
You could say that these people speak from experience; but listening, one senses something deeper. There is a strain of anger and alarm that goes far beyond the immediate, and it is this deeper sense that the Science Museum of Minnesota explores in its exhibit, *Wolves and Humans*, that now is touring the U.S. The exhibit has a tableau of mounted wolves (killed by cars and in the depredation-control program), video tapes of wolf movements, recordings of wolf howls and other elements. But I found most interesting its look at human perceptions of the wolf. Ellen J. Stekert of the University of Minnesota made an extensive study for the exhibit on folklore's view of the wolf across many cultures and eras. She has analyzed the pejorative expressions that have come down to us—wolf at the door, wolf in sheep's clothing, womanizing man as wolf, wolf as a wild and violent musical note, a wolf pack of submarines and countless others, including the Old West image of the lone wolf, dangerous and antisocial.

From the wealth of material available, Stekert drew legends and stories that portray the wolf in many ways. There is the Japanese lad who found a wolf choking on a bone, pulled it out and made a friend for life; Aesop had a similar story about a crane that extracted the bone and found the wolf less grateful. Foxes frequently outwit wolves (we ridicule what we fear) and wolves are offered equally as wise and credulous. The Menomini creation myth has the first man born as twin to a wolf and in Nordic mythology the great wolf Fenrir is bound with an unbreakable cord made, writes Stekert, "from the invisible but powerful things of the earth such as the roots of mountains, the breath of fish, and the noise of cats as they move." The cord will break at the end of the world and free Fenrir to swallow earth and sky.

There are countless other stories, from Europe and the American frontier, of wolves that only silver bullets could kill, that came year after year and left no prints in the snow. There are many positive tales of wolves suckling human children, as in the Romulus and Remus legend, and other stories featuring the wolf as villain, as in *Little Red Riding Hood* and *The Three Little Pigs*. Wolf stories often carry a flavor of rapacity that we assign no other animal, seen (among other things) in Willa Cather's description of the Russian wolves that pursued a sleigh until a bridal couple was thrown off to appease them.

On and on this endless folklore goes. The point is that although many species are endangered, none is freighted with more emotional baggage for man than the wolf. That's why it is so important to us. It is small consolation to know that it is alive and well in Alaska, Canada and Siberia if we fear for its welfare here. The wolf is embedded in our culture. It was with us before memory. Its survival here is a test of our capacity to preserve what is left of the wilderness.

Facing a future as uncertain as its past, a lanky symbol of the wild chases its shadow across a sunlit field.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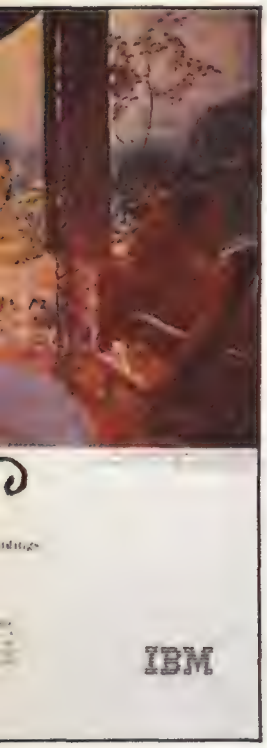
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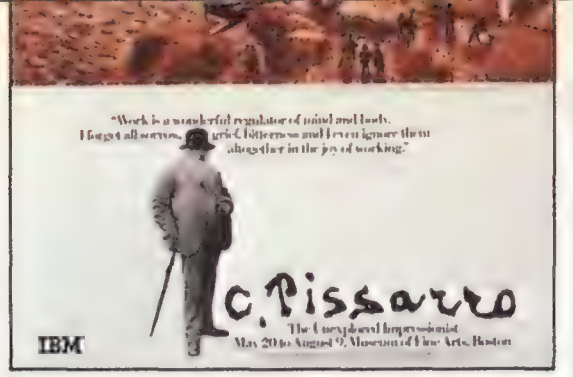
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I forget all sorrows, griefs, bitterness and I even ignore them
altogether in the joy of working."
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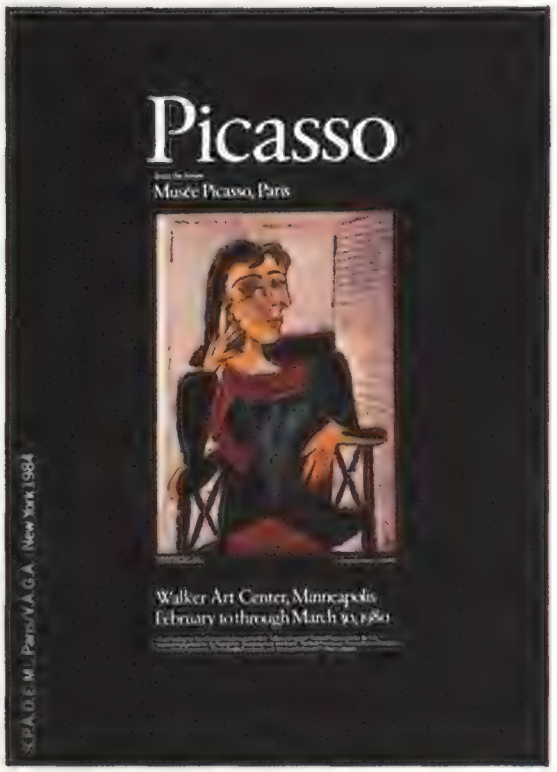
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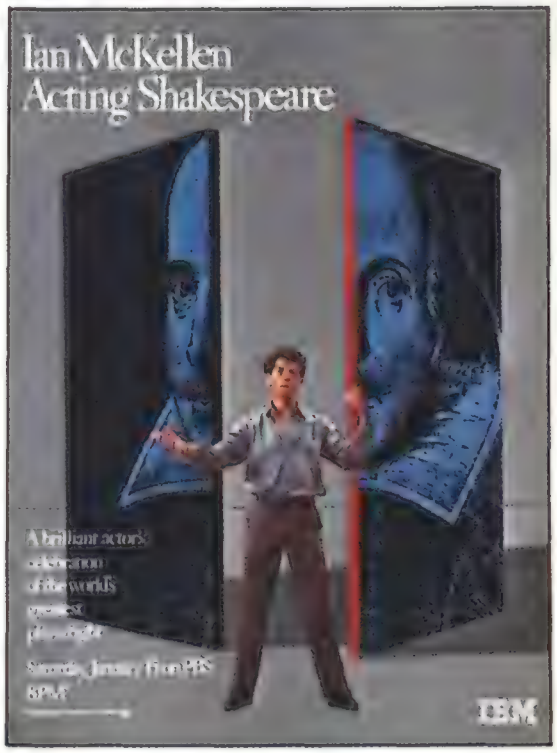
Ian McKellen
Acting Shakespeare
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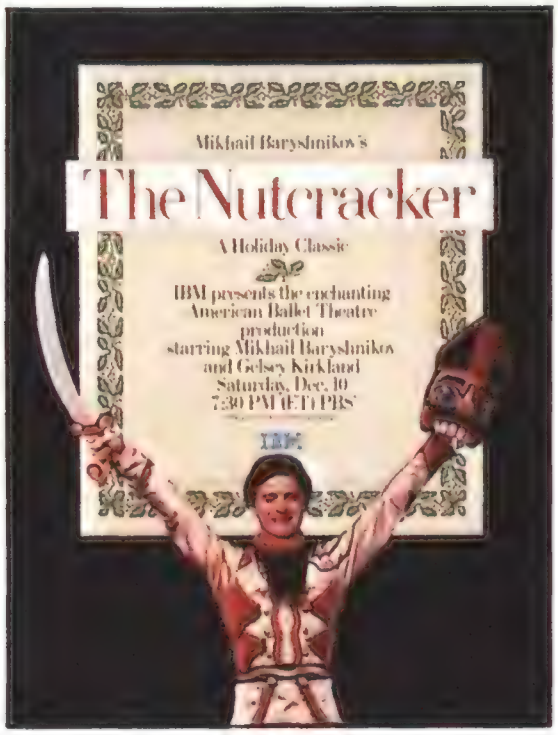
Mikhail Baryshnikov's
The Nutcracker
A Holiday Classic
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production
starring Mikhail Baryshnikov
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Paintings and Drawings
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Madison Avenue at 56th Street
December 9, 1983–January 21, 1984
Tues.–Fri., 11 a.m.–6 p.m. Sat. 10 a.m.–5 p.m.
Free Admission
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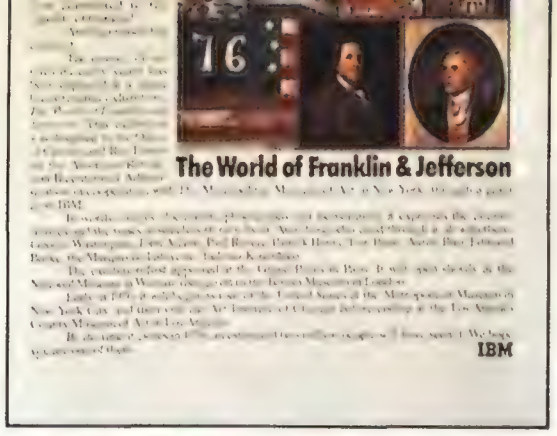

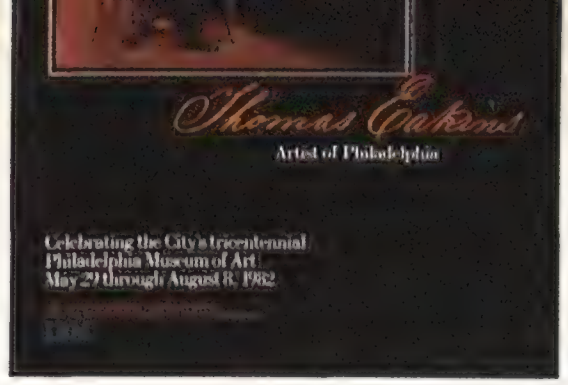

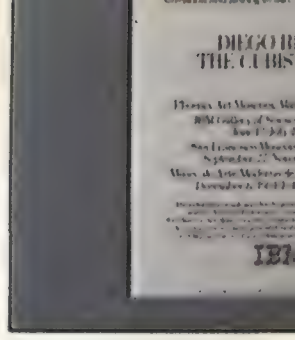

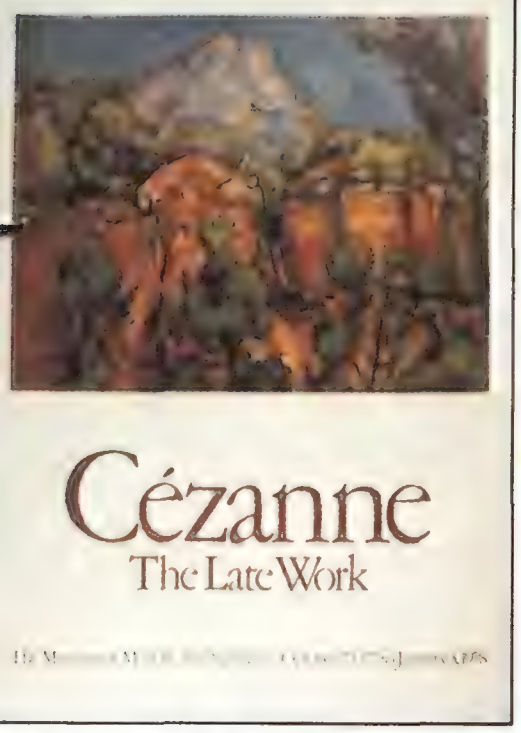

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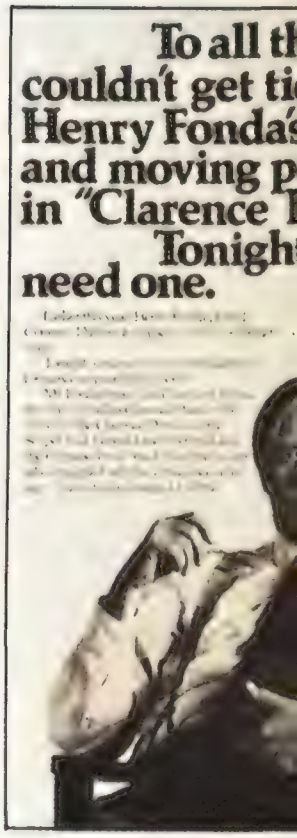

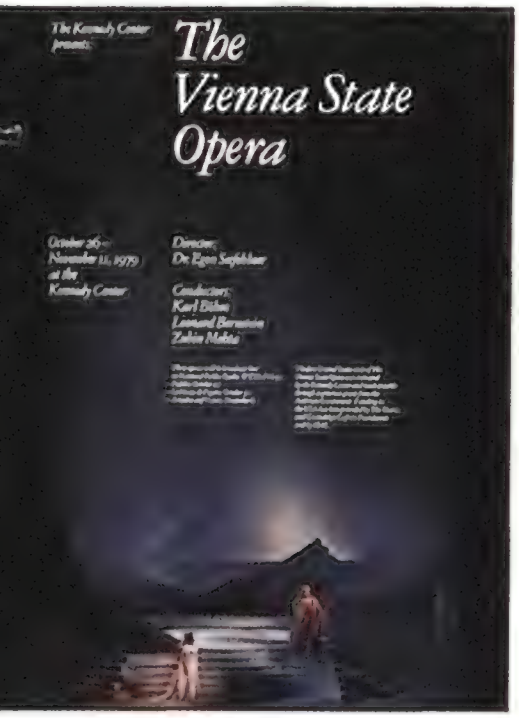
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Director: Dr. Egon Seefehlner
Conductors: Karl Böhm, Leonard Bernstein, Zubin Mehta

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An inspiring portrayal of Emily Dickinson, the great American poet who understood the joys and sorrows of the human heart
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Encore Saturday, January 1, 8:30-10 p.m. ET*
Matinee Sunday, January 2, 2-3:30 p.m. ET*
Presented nationally on The Public Broadcasting Service
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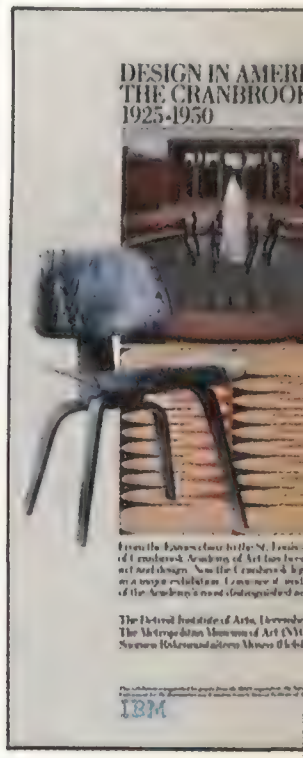

We're also interested in computers.

These are some of the many art exhibitions, musical events, and television specials that IBM has supported over the years. Which goes to show that a company known for state-of-the-art technology can also be interested in the state of the arts.

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W 660Y

By Thomas A. Bass

By land and by sea and even by air, pedal power wins

They can look like fish, beans or fat cigars, but their creators think that singular cycles may represent the shape of things to come

"Spectators, please keep an eye on stray dogs and stand back from the roadway," booms the announcement over the public-address system. "If you've never seen one before, you'll be surprised by the speed of these vehicles."

In a "Le Mans" racing start, 35 drivers sprint for their machines and pedal across the line. Riding bicycles and tricycles aerodynamically streamlined into human-powered vehicles, or HPVs, contestants zip around the corner on a tight course through Thamesmead, a new community of 25,000 built on reclaimed marshland ten miles east of central London. As spectators lean over their apartment balconies, or finish a pint of ale in front of the Wild Fowler pub, the Round the Houses race—one in a long weekend of land and water events at the Thamesmead Festival of Human Power—gets off to a rousing start.

"That's really rather lovely," says a woman, pointing to what looks like a fiberglass angelfish rolling past her front lawn. Cries of approval greet what might be a torpedo wrapped in cellophane. "There goes a Vector, the world-record holder at 58.89 miles per hour," shouts the announcer. "Designed in California and powered today by a German, that's the machine to beat."

Peter Ross uses his feet and a battery to power his personally designed *Trice* through London suburb.

"It looks like he's going to get knackered when he goes," remarks an observer on seeing what looks like a baby whale with Jonah pedaling inside it. "It's the Pink Panther on wheels," someone else shouts as a streamlined pod, with its driver wearing a purple skin suit, a fluorescent furry helmet, and a mad grin on his face, scoots around the corner.

There follow in quick procession a host of pedal-powered machines bred by crossing bicycles and tricycles with the aerodynamic body shells of Formula One race cars. The vehicles resemble cruise missiles loose on the road, go-carts sheathed in Saran Wrap, a steam iron on wheels, and cigars—either perfectos or stogies—with human power plants at work inside.

Human-powered vehicles include any machine flown, floated or rolled over the surface of the globe by means of pedals, levers, gears or cranks operated solely by the propulsive power of one or more human beings. Human power is proving to be an old idea with new applications, and lately there have been a number of revolutionary advances in the design of HPVs. Some committed enthusiasts see them as the "commuter cars" of the future while others are searching for a more efficient machine that is no longer dependent on nonrenewable energy sources for fuel. As a sign of how international these efforts have become in the ten years since they have been an organized activity, the Thamesmead Festival attracted spectators and competitors from the United States, Spain, France, Denmark, Germany, Holland and the British Isles.

Sense of humor helps when naming a machine

Judging from the names on their machines, the contestants themselves are aware of the humor involved in hurtling down a track at 45 miles per hour in a fiberglass angelfish. There is *Glensprocket* from Scotland and *Morgen Verder* from Holland, so named, says young Willis Bos, "because that's what my mother says at night when she tells us to come in out of the garage: 'Tomorrow you go further.' " Other entries include *The Bean*, which Miles Kingsbury, its designer and racer, describes as "an armchair on wheels." A French vehicle, *La Cigale*, or the cicada, is named after the chirping sound it makes on getting up to speed.

Chirping aside, "the funny thing about these machines," says a bystander leaned up against the hood of his car, "is that they make hardly any sound at all." And it is true that out on the straightaway nothing more audible comes from the track than the whisper of rubber over asphalt and the *ping, ping, ping* of bicycle chains toothing over sprockets.

Taking place among numerous speed trials and long-distance events, the Round the Houses race offers a novel chance to test HPVs out on the street, where

Photographs by Martha Cooper

International festival for pedal power

Encased in a streamlined cover, his helmet held in place by string, Martin Kortlucke is readied for sprint.

speed has to be balanced along with maneuverability and sturdiness of construction. Racing past houses and high-rise buildings, the Vector crashed on a tight corner around some trash cans. The announcer later reported that "*Dark Horse* seems to have been sent out to pasture with a flat tire." Winning the race were two Burrows Windcheetahs, with their designer, 41-year-old Mike Burrows, having donned a furry fluorescent crash helmet to finish second to his teammate with the mad grin, Andy Pegg.

"The course was tailor-made for us," said Burrows after the race. A free-lance engineer from Norwich, England, he has sold a number of his streamlined tricycles, which are popularly known as Speedies. "I designed it as a commuter vehicle," he said. "They're cozy, warm, dry, safe, stable and fun."

I later had the chance to verify Burrows' claims when he lent me his Speedy during a pause in the time trials. The Windcheetah sat low on the ground, with a wide track. There were two wheels up front and a drive wheel behind. I rode in a recumbent position—not unlike that assumed while lying face-up in a hammock. A scooped seat nicely supported my back while I pushed forward on the pedals. The Speedy's gears, brakes and steering column were conveniently mounted on a joystick held between my legs. Built out of an aluminum chassis enclosed in a fiberglass shell, weighing 56 pounds altogether, it costs £1,025 (about $1,300 at the current exchange rate).

Taking the highways low to the ground

On donning a fluorescent crash helmet, I took off at a wicked clip down a stretch of Thamesmead highway. The acceleration was terrific. Thrust on the pedals, endurance and comfort were all greatly improved by lying on my back in a form-fitted seat with headrest. The tricycle design kept me low on the ground and nicely stable as I picked up speed. Zipping along at more than 25 miles per hour, I could happily have pedaled all the way to London.

The 70 participants in the Festival included a cycle-driven airplane with an 80-foot wingspan (the machine limited itself to a static display), ten watergoing vessels of "unorthodox" design, a handful of electrically assisted vehicles (competing in a special category) and a profusion of bicycles and tricycles built out of lightweight alloys and plastics streamlined into aerodynamic shapes. Pitching their tents in a meadow shared with gypsy ponies, festival-goers—who ranged from college professors to goatherds from the south of France—swapped rides on their machines and compared notes on their latest designs.

According to mythology, the first human-powered vehicle was built in ancient Greece, where Daedalus

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Georges Mochet, manufacturer of French Vélocars in 1930s, pushes grandson Sebastien off at Thamesmead.

American competitor Cary Peterson prepares for race in Speedy that she will take on U.S. tour this year.

Winner of the Round the Houses race, flamboyant Andy Pegg drives his Windcheetah through town.

fashioned wings of wax for a flight from Crete to Sicily. He succeeded in his escape to freedom, although his son, Icarus, died in the attempt by flying too close to the sun. What appear to be suggestions of human-powered machines are depicted in the frescoes of Pompeii. In the Renaissance, with the technology of gears and cogwheels already well advanced, Leonardo da Vinci sketched designs for machines resembling the helicopter and airplane.

Experimental four-wheeled vehicles propelled via levers, treadles and hand cranks cropped up in Europe during the 1700s. Two-wheelers, arriving a bit later, came in the form of "hobby horses," "boneshakers" and "ordinaries"—the name for the high-wheel bicycle much favored by adventurous Victorians. Following its introduction in the 1880s, the Rover safety bicycle, with its wheels of similar size and chain step-up transmission, established the standard bicycle format, which remains essentially unchanged today. The bicycle played a crucial role in liberating 19th-century women by providing, for the first time, safe and affordable mobility. It continues to be one of the world's most widely used forms of mechanical transport. (Even in the United States, whose infrastructure is designed around the automobile, there are 100 million bicycles among a population of 125 million automobiles.)

Bicycle riders rank high among traveling animals and machines in terms of efficiency. Over the same distance, they expend about one-fifth the energy of a person on foot. After a calculation converting calories into gasoline, bicycles are found to get close to 3,000 passenger miles per gallon. This wonderful machine can carry a payload ten times its weight. Its drive mechanism translates 95 percent of a rider's energy into usable output. Bicycles with world-class racers can attain speeds as high as 44 miles per hour (a record set in 1982 by Sergei Kopylov of the USSR).

Having proven so cheap and effective, why would anyone want to tamper with their design? Because this wonderful machine can be made even better. Its human-powered efficiency can be expanded to include waterborne as well as flying machines. Also, cycle technology might well provide the key to efficient transportation in the post-petroleum age. HPV designers have gone a long way toward the production of cycles that are faster, more stable and better protected from the elements, and when batteries or some other form of electrical assistance are added to these machines the new human-powered vehicles could come close to being the commuter car of the future.

Other than modifications in tire design, gearing and

Thomas Bass wrote on the California Conservation Corps in April of 1983. Houghton Mifflin will publish his book on computers and gambling in May.

KAREN TRAVIS' ALASKA JOURNEY.

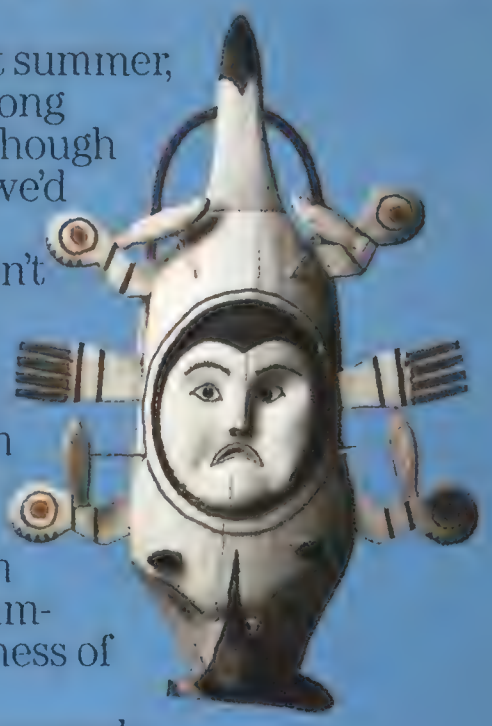
Karen and Robert Travis, Sandy, Utah

When Robert and I went to Alaska last summer, it fulfilled a dream we'd held for a long time. The funny thing was, even though we'd traveled all over the world, we'd never been to Alaska.

Now, looking back on it, I don't know why we waited so long.

So much of Alaska stands out in my mind.

I think of watching the moon shimmering a magical reflection across miles of still water. The untouched beauty spreading in all directions. The gigantic summer blossoms. And the richness of the native art and culture.



But mostly, I think of the people. So friendly. So open. So free with their time. The spirit there is so fresh and alive. Robert is sure that kind of pride and spirit is what our grandparents must have felt years ago.

I think the hard part about dreams that stay with you is when they finally come true, they are oftentimes disappointing. But not Alaska.

All I can tell you about our Alaska dream is that it's more alive than ever now. And we've already begun plans to go back and live it again.

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Once you've gone to Alaska, you never come all the way back.

A L A S K A

materials, efforts to improve the bicycle have focused on the problem of wind resistance. This general term covers two specific forces, one frontal to the body in motion, which is felt as wind pressure, and the other parallel to the surface, which is known as skin friction. A cyclist traveling 20 miles per hour displaces roughly 1,000 pounds of air a minute. At this rate, 85 percent of one's effort goes into struggling against aerodynamic drag (rolling resistance accounts for the rest). At top speed for a normal cyclist—somewhere around 30 miles per hour—a sudden burst of power doubling one's output would increase one's speed by some eight miles per hour. Most of this power goes into fighting the wind, and the interesting fact is that the same increase in speed would be possible by streamlining the vehicle and cutting its aerodynamic drag in half. On the surface of the moon, where there is no atmosphere and little gravitational pull, a cyclist could comfortably cruise at speeds well over 200 miles per hour.

Back on Earth, the two ways to reduce aerodynamic drag on bicycles and other human-powered machines are to change either the design of the vehicle or the position of the driver. Upright posture on a touring bicycle is aerodynamically comparable to moving a wall through space. A racing crouch over the handlebars is better, but better yet is a human body propelled forward while lying on the back or stomach.

Vélocar riders lean back to drive

In 1912 Étienne Bunau-Varilla of France—inspired by the dirigible balloon—patented a streamlined enclosure for a bicycle and rider called the Vélo Torpille. In 1933 Charles Mochet, another French inventor, began manufacturing his own recumbent vehicle (pedaled by a rider lying on his back). Up until the outbreak of World War II, his son, Georges, sold nearly 1,000 Vélocars a year in two- and four-wheeled designs. There was a poignant moment at the Thamesmead Festival when Georges Mochet launched his grandson down the track in a vehicle inspired by the original Vélocar.

After World War II, further experimentation with streamlining and redesigning human-powered vehicles met two major obstacles. Continuing the policy begun in 1939, the Union Cycliste Internationale forbade aerodynamic devices and recumbent bicycles in its official events. The second obstacle had to do with the arrival of the automobile as the quintessential index of upward mobility. Advances in cycle design received little public attention. In 1973 Chester Kyle, a professor of mechanical engineering at California State University, Long Beach, unknowingly duplicated some of the experimental work already done in Europe. Interested in researching the rolling resistance of tires, Kyle enlisted students into riding a bicycle down a college corridor. To collect a wider range of data, he decreased the drag on his cycle by fitting it with an aerodynamic shell. Kyle discovered that this new vehicle went significantly faster than his old bicycle. When he had it tested on a nearby airfield with an Olympic athlete to power his streamlined machine, four world speed records were set—none of them recognized by the Union Cycliste Internationale.

German team member on a practice run rides a Vector without its "fairing," or streamlined shell enclosure.

Prone bicycle, also without a fairing, gives Dutch team member awkward but efficient cycling position.

Rebuffed but undaunted, Chet Kyle and Jack Lambie, an aerodynamic consultant and bicycle enthusiast who was also working on a better machine, organized their own speed races in 1975. A year later the International Human Powered Vehicle Association was founded. Since then, in an efflorescence of ingenuity and design, one record after another has fallen to the advancing technology of human power.

By paying attention to every kind of resistance and

Red mummylike wrap offers weather protection and probably works as a fairing for one festival-goer.

Caught yawning, Trevor Bull waits for start in only two-man recumbent vehicle entered, *Dark Horse*.

Students at Highview High School near London came up with an HPV which hit top speed of 36.61 mph.

International festival for pedal power

the countermeasures necessary for overcoming it, the new human-powered vehicles are pushing hard on the Du Pont Prize: an award of $16,000 going to the first single-rider vehicle capable of reaching 65 miles per hour. At present the world's fastest machine is the *Vector Tandem*, designed by a team headed by Allan Voigt, a California engineer who divides his ingenuity and time between aerospace technology and HPVs. In 1980 the two-person Vector, ridden with its drivers sitting back to back, was clocked at the Ontario Motor Speedway in California traveling at 62.92 miles per hour.

Recently there has also been great progress in human-powered flight. Though British industrialist Henry Kremer has put up substantial sums of money for various prizes, he has watched Americans walk away with most of it. The key figure in these successful efforts is California-based Paul MacCready. Known as the "father of human-powered flight," MacCready is a technological wizard when it comes to getting his ideas airborne. MacCready's *Gossamer Condor* won the original Kremer Prize in 1977 by flying a figure eight course in six minutes and 22 seconds. The *Gossamer Albatross* was the first human-powered aircraft to fly the English Channel (see SMITHSONIAN, February 1981), and the *Gossamer Penguin* followed as the first piloted vehicle to fly exclusively by means of solar energy. In 1981 MacCready's *Solar Challenger*, again powered by sunlight, also crossed the Channel.

Pedaling at full speed, rider points sideways, direction waterbike is headed as it wins Round the Buoys race.

The Monarch *takes on the* Bionic Bat

Though disqualified on a technicality, MacCready's *Bionic Bat* met the conditions for winning the first major chunk of the current Kremer Prize—£20,000 to the first essentially human-powered plane to fly a triangular course in less than three minutes. Before the *Bat* could be launched for the required, second attempt, the *Monarch*, an aluminum-and-Mylar plane built by students at the Massachusetts Institute of Technology, succeeded in claiming the first prize. The *Bionic Bat*, however, is now in line to win £5,000 for besting the *Monarch*'s flight time.

Peter Selby, the independent filmmaker and cycling buff who organized the Thamesmead Festival, imagines that next year's competition will include aerial events for machines still in the process of being designed, including electrically assisted ultralights. "I don't know if such things exist yet," he said, "or how useful they might be, but what matters in building human-powered vehicles is not necessarily their practicality. What matters is the leap of imagination that inspires people to try something new."

On water an HPV appears to have broken a speed record established by the older technology. In October, a human-powered, single-rider hydrofoil, *Flying Fish*, achieved a speed of 11.2 miles per hour. Designs for new craft include variable transmission pedal boats and submarines. "Human-powered submarines sound farfetched," said Selby, "until you stop to think how much faster submarines are than many vehicles traveling over the surface of the water. Nuclear submarines already get about 35 miles per hour, and humans could take advantage of some of the same reductions in turbulence found by operating underwater."

After sweeping records across the board on land and up in the air, the human-power movement is asking itself "What next?" Single-passenger vehicles incorporating HPV technology—although powered by a gasoline engine—are currently capable of getting more

Martyn Cowley

than 300 miles per gallon under typical highway conditions. But many of the new designers are hoping to go beyond the internal-combustion engine to the next phase in human transport.

Derek Henden, an engineer who helped create the record-winning Avatar Bluebell, which combines a recumbent bicycle with a streamlined fairing of his own design, seemed to express the general sentiment of competitors at Thamesmead: "I'm hoping for a marriage between battery and human power to produce a small urban transport vehicle. This must happen in the next 20 years if personal transport as we know it is going to continue."

Electrically assisted vehicles were welcomed at the Festival alongside those powered solely by humans, and £1,000 in prize money was given in this special category by Sir Clive Sinclair. After revolutionizing the electronics industry by introducing microcomputers affordable to the masses, Sir Clive is applying his technological prowess and merchandising élan to battery-assisted transport. The Sinclair Vehicles Project has an electrically powered machine in the wings, ready soon for unveiling.

"The best thing about the Thamesmead Festival," said Peter Selby, taking the long view of an Oxford-educated historian looking back on his most recent international competition, "may have been the combination of human power and electric power. These vehicles of the future won't be powered by lead-acid batteries or nickel-cadmium batteries, but by some entirely new design. Whether on the ground or in the air or underwater, I'm expecting all these advances to link up together."

"The nice thing about building HPVs," said Mike Burrows, "is that we're all guessing. All you need to come up with a new design is a flexible brain and a lot of imagination. The technology is so new that we set out every day to reinvent the wheel."

Paul MacCready's *Bionic Bat* is battery assisted but it was designed as basically a human-powered aircraft. The *Bat* has flown around a 1,500-meter, triangle-shaped course in two minutes, 43.28 seconds.

The more you hear

What would long distance service be
if it only served selected cities
at selected hours...
If there were no operator service...
no person-to-person or collect calling...
no immediate credit for wrong numbers...

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And over a century of commitment.
That's AT&T.
The more you hear the better we sound.

AT&T

Reach out and

the better we sound.℠

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AT&T

"... got long burst into two-seater which sent her scurrying home"

"... just as he left the burning plane"

By Edwards Park

The greatest aerial warfare photos go down in flames

National Air and Space Museum sleuths add a dramatic climax to the mysterious saga of famous photographs from World War I

"We came down full engine on and could see obs. reaching over into the pilot's cockpit, apparently trying to pull him off the stick, so he must have been hit, as he was slumped forward. We were diving at terrific speed and I pressed the triggers—just for *bonne chance*. Whether or not I put any lead into him don't know, but just as I was shooting his wings suddenly collapsed and floated past me. He went down like a stone. . . ."

Today, it sounds a little like Snoopy talking out one of his dreams of glory as he pretends to fly his doghouse through the frames of the "Peanuts" comic strip. But this text, and the incredible photograph of a World War I observation plane coming apart in midair, are from a highly acclaimed best-seller, *Death in the Air*, subtitled "The War Diary and Photographs of a Flying Corps Pilot."

Published in 1933, the book won raves (". . . a true and authentic story of youth caught up in war"). But its descriptions of aerial combat were old stuff to any kid in knickers who kept *au fait* with the literature of combat flying in World War I, from books like Nordhoff and Hall's *Falcons of France* to *G-8 and His Battle Aces* and other pulp magazines. The photographs, however, were something else. No one had ever seen such pictures of dogfighting, the planes so close, the sense of action so breathtaking.

Here are British S.E.5s and Nieuports with rondels on their wings tangling with Albatroses and Fokkers wearing the Iron Cross. One photograph catches a German pilot falling head-first from a plane engulfed in flames. You can practically see the gleam on his boots. In another, an inverted "Nieup" wearily folds its wings. Yet another catches debris flying as a Bristol and a Fokker collide in midair ("God, what a sight," says the caption).

Camera from a downed German plane

These action-packed pictures were snapped, writes the anonymous author, by a camera he managed to wrench out of a downed German plane. Miraculously, the lens and ultra-fast shutter were unbroken, and the author notes that his friend Jock "suggests I fit a five by four rack in it and fasten it to the bus in some way and take pictures with it while up."

With the help of his ground crew, the pilot rigged the camera under a wing of his plane, beyond the arc of the propeller. He controlled it with his machine gun: the shutter clicked with the first shot. "So when I am sitting on a Boche's tail ought to get snap of beggar same instant I put a burst into his hide."

According to the book the author found plenty of bugs in the arrangement. First, the shutter wouldn't work in flight. The linkage had to be shielded from the slipstream. Then the pilot wasted his only photo when

As wounded warrior, Wesley Archer was photographed after being shot down on the Western Front in 1918.

reaching high altitude he forgot and fired a random burst to keep the grease in his guns from congealing. His fitter added an extension to the trigger, allowing him to warm the guns without using up his one chance to click the shutter.

Readers learned from the book's Foreword that the author died "as he would have wished to die—the death which so many of his friends had died." Since it was strictly against Royal Flying Corps regulations to take unofficial pictures of combat, his typewritten diary was purged of any references that would give away his name or identify his squadron. The author and his friend had meticulously retouched the photos to erase squadron markings on the planes. And because one of the author's fellow pilots had remained in what was now the Royal Air Force, the photos were carefully kept under wraps. They weren't displayed, in fact, until more than *12 years* after the Armistice.

In February 1931, the New York publishing house of G.P. Putnam's Sons, ever partial to adventurous themes, sponsored the first international exhibit of aviation art, entitled "The World in the Air." The Cockburn-Lange Collection, a portfolio of these same anonymous aerial combat photographs, was the hit of the show: ". . . the most vividly realistic of all the air records that came out of the war." The reviewer re-

Contributing editor Edwards Park flew fighter planes for the U.S. Air Force out of New Guinea during World War II.

Revealing snapshot shows Archer (right) in Nyack, N.Y., backyard working on models scaled to blueprints.

Fokker Trimotor photographed for Pan American illustrated Archer's aerial flare for the dramatic.

ported that the collection was brought to the United States by a Mrs. Richard W. Cockburn-Lange and that the pictures "were taken by a pursuit plane pilot of the Royal Air Force, who lost his life in action."

In March of that year the photos won raves in Philadelphia. In October 1932, two of the photographs filled a double-page spread in *The Illustrated London News* under one of that magazine's less restrained banner headlines: "The Most Extraordinary Photographs Ever Taken of Air Fights in the War." A British newspaper serialized "British Airman's War Diary," with pictures, and it soon became *Death in the Air* in book form.

But some veterans of air combat smelled a rat. One of the facts of life in combat flying is that there are a good many flights when nothing much happens. In my own limited experience in World War II, I remember being frightened most of the time that something *would* happen, but simultaneously frustrated that nothing *did*. My churning adrenaline seldom found an outlet in violent action (which is doubtless why I survived). Yet this anonymous British airman took nearly 60 publishable photos, each on a separate mission, each snapped when he opened fire at enemy planes.

In 1932 C. G. Grey, controversial editor of Britain's famous aerial magazine, *The Aeroplane*, waspishly noted that none of the aircraft pictured in the diary "was in use before the middle of 1917," about 15 months before the Armistice, and reasoned that if the ratio of duds to good pictures was anywhere near normal, the pilot must have met the enemy at least 240 times. World War I pilots reported that for every combat flight they often flew "twice or three times without ever getting mixed up in a fight at all." Yet by his admission, the anonymous pilot was *not* an incredibly good photographer. He notes plenty of poor, even blank exposures. So to account for all those successful pictures he must have flown an unbelievable number of missions in 15 months.

Both the RAF and the Imperial War Museum demurred at buying or displaying the photographs until their authenticity was proved. Britain's Air Ministry picked up on the subject, and the matter was even hotly debated in the House of Commons.

All objections to the Cockburn-Lange photographs could be laid to rest, said the editors of both *The Aeroplane* and the magazine *John Bull*, if Mrs. Cockburn-Lange would just vouch for their authenticity. But the lady remained as elusive as the identity of the pilot-photographer. Air Ministry spokesmen assured the House of Commons and, by letter, Mrs. Cockburn-Lange that no disciplinary action would be taken for this breaking of photographic regulations. Even though Sir Hugh Trenchard, Commissioner of Scotland Yard and former Marshal of the RAF, requested a personal meeting with the mystery woman, she found polite ways to avoid it. All communication with her went through either a travel agency or a literary agent. In Britain, she once appeared in person to talk with the editor of *Popular Flying*. She also may have shown up—either that or phoned—offering to sell the photo-

The mysterious Cockburn-Lange collection

Archer memorabilia included camera, helmet, goggles, swagger stick and gunsight from his downed plane.

graphs to the Imperial War Museum. In postwar Britain, however, her privacy was doubly respected. After all, she was a lady—and also the widow of a war hero.

But there was no stopping the triumph of the Cockburn-Lange photographs. Despite the controversy, throughout the 1930s they appeared again and again to illustrate histories of the early days of air warfare. Trevor N. Dupuy's book, *The War in the Air*, uses one of the more spectacular dogfight pictures on its jacket. Arch Whitehouse, a prolific writer on the subject, has an artist's version of a Cockburn-Lange photograph on the jacket of his *Decisive Air Battles of the First World War*. And many a former ace acquired a few prints to stir memories of his youthful sorties over France.

Gradually the excitement of the photographs was eclipsed by World War II, which brought its own images of air warfare. The startling prints disappeared from the pages of magazines. Books on the early days of air combat were remaindered. The name Cockburn-Lange was forgotten. Life went on.

Last year, the Smithsonian's National Air and Space Museum took delivery of several large suitcases—a donation from a certain John W. Charlton of Gloversville, New York. The bags contained stacks of letters and news clippings, a .45 Colt automatic with a dent in it, World War I aviator uniforms, a 1918 camera and various other items. They had belonged to Charlton's lifelong friend, a World War fighter pilot named Wesley David Archer. No one at the Air and Space Museum had ever heard of him. Then along came aviation researcher Peter Grosz.

He recalled Rickenbacker and Richthofen

Son of the German satiric artist, George Grosz, Peter was at the museum digging up some facts on (of all things) the Austro-Hungarian planes of 1914-1918. He was in the museum library one evening, trapped by a sudden rainstorm, when he saw some photographs spread out on a table. They drove away all thoughts of the two-seater reconnaissance aircraft of the House of Hapsburg. For these pictures, part of the Wesley D. Archer material, were originals from the Cockburn-Lange Collection, and Grosz recognized them.

Grosz is just at the right age to remember the dogfights in the old pulp magazines. He had read the books which dealt with the Royal Flying Corps and the Lafayette Escadrille, told of Fonck and Guynemer, of Billy Bishop and Eddie Rickenbacker, and described an awkward young pilot named Manfred von Richthofen arriving at Oswald Boelck's famed *Jagdstaffel*. Grosz had seen the films like *Wings* (with Clara Bow, the "It Girl"), which won the first Oscar in 1928, and Howard Hughes' *Hell's Angels*. Those photos of little biplanes locked in combat were as familiar to him

HOW TO TALK TO TEENAGERS ABOUT DRINKING AND DRIVING.

KEEPING OUT OF HARM'S WAY.

Teenagers can get into a lot of trouble with alcohol. Even teenagers who don't drink. Often they aren't aware of the facts.

A new view of the statistics shows where part of the problem lies, and can lead to a better communication between adults and teenagers.

Teenagers are in the high-risk group. People between the ages of 16 and 24 represent only 20 percent of the licensed drivers of our country. But that same group is involved in 42 percent of all the alcohol-related fatal crashes. When you think about that, two tragic things are revealed:

First, not all teenagers killed in such accidents are themselves drunk at the time. Often they have had nothing to drink at all, but are passengers in cars driven by teenagers who have been drinking.

Second, teenagers are often on the roads late at night, especially on weekends, when most crashes involving alcohol occur. They are targets for cars driven by people who have had too much to drink.

Some facts about alcohol you might want to discuss with teenagers are often surprising to adults:

• One can of beer, as well as one eight-ounce glass of wine, and one 1½-ounce drink of 86-proof liquor are all equally intoxicating. The risk is the same regardless of what you've been drinking.

• The legal definition of intoxication is based on "Blood Alcohol Concentration" or "BAC." If you have a BAC of .10, you are legally drunk in most states. But for drivers or drinkers who are less experienced, a BAC of .05, or sometimes lower, can be dangerous.

• Even relatively low levels of alcohol can reduce your tolerance to injury, increasing the danger in an accident.

Arm your teenagers with the facts and give them time to reflect on them.

If expected to show good judgment, teenagers are more likely to live up to it.

Please discuss the problem of drinking and driving with your teenagers now, and if you think this advertisement will help, ask them to read it.

And keep in mind, that the best way to teach young people—as they may tell you—is by example.

The people of General Motors care, and urge teenagers, and their parents, to give serious thought to the dangers of drinking and driving. It's something we all can do.

This advertisement is part of our continuing effort to give customers useful information about their cars and trucks and the company that builds them.

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as the wallpaper of his boyhood bedroom. So was the story of the controversy that had risen around them.

Looking now at this display, as a sophisticated adult of the 1980s, Grosz saw that the Cockburn-Lange photographs were simply too good to be true. What missions the author must have flown to capture such action on film! Midair collisions, wings crumpling, pilots leaping to their deaths—everything seemed to happen just as this one extraordinary aviator was touching off his first machine-gun burst of the flight, aimed, apparently, in precisely the right direction.

The pictures, moreover, show remarkable close-ups of British as well as German planes. Admittedly, World War I biplanes got much closer to one another before firing than did the fighters of the second war, but, looked at with cold rationality, many of the photos seem to point to an inevitable collision.

Peter Grosz enlisted the valuable help of Karl Schneide, a curatorial assistant who grew up at the airport in Rhinebeck, New York, where visitors can still see a Fokker triplane and a Sopwith Camel wheel and dive in mock combat. The two men began sorting the letters and clippings—and 109 Cockburn-Lange negatives.

The pair of sleuths discovered that rights to a diary, notes, negatives and "fifty-seven (57) photographs now owned by me and known as THE COCKBURN-LANGE COLLECTION OF AERIAL COMBAT PHOTOGRAPHS" were assigned by Gladys Maud Cockburn-Lange to Wesley David Archer. The agreement, moreover, was notarized by a Wm. C. Archer and witnessed by an M. E. Archer. Says Grosz, "That seemed like an awful lot of Archers."

Then there was the matter of Gladys Maud Cockburn-Lange's signature. Hers was a long and awkward name, and apparently she had trouble with it. On a legal document, she had to break the last name at the hyphen, dropping the "Lange" underneath the "Cockburn." Grosz and Schneide figured that anyone saddled with that name for a long time would have worked out how much room to leave for it.

But Gladys Maud was still single in 1921

Finally, some papers revealed that Wesley Archer's wife, usually called Betty, had, by an amazing coincidence, the same first names as Mrs. Cockburn-Lange. She, too, was Gladys Maud. An expert, Dr. David Crown, attested that their handwritings belonged to one person. Had she previously been married to the anonymous British pilot? A little digging showed that she was still single in 1921, three years after the author of *Death in the Air* was supposedly killed.

With Mrs. Cockburn-Lange unmasked as an utter fabrication, Grosz and Schneide began nosing along Wesley Archer's trail. They found he had been an authentic pilot, an American serving with the RAF (his parents were Canadian). He had gone to Columbia University, worked in a bank at Nyack, New York, where his family had a summer house, and joined what then was still known as the Royal Flying Corps in 1917. On October 9, 1918, he was shot down by ground fire while strafing German infantry in his S.E.5. A bullet headed for his heart was deflected by his Colt automatic—the badly dented one at the museum.

Photographs of Archer show a rather dashing young man, not unlike the great old movie star, William Powell, or for later generations the Englishman, Higgins, in the popular TV show, *Magnum, P.I.* He convalesced in Britain, returned to the States in 1920 and set about finding something to do. Being clever, skillful, restless and creative, he eventually ricocheted into the youthful film industry as a set designer and (you guessed it) model maker. He even went to Berlin to do miniature sets for movie productions.

Back in the States again, he worked on publicity for the Florida land boom of the Twenties and set up an architectural model of Pan American's Miami facility —with models of Fokker Trimotor transports to lend verisimilitude. He suspended one of these model planes with propellers turning in front of a dark backdrop that would black out the lines that held it up, then, probably just for fun, photographed the Fokker with a small explosive charge going off under it, like antiaircraft fire.

In 1927 Wesley and Betty Archer moved up to New York. Back in the summer place at Nyack, Archer and a friend began building the model planes that would

Successful sleuths Peter Grosz and Karl Schneide look over prints and posters from Archer's suitcases.

The 1985 Presidential Inaugural Day Plate

A stately tribute to America's Presidential Inauguration to be issued only on Inaugural Day 1985

On January 21, 1985 — Inaugural Day — another link in the unbroken chain of America's leadership will be forged as Ronald Reagan takes the Oath of Office for his second term as the fortieth President.

To commemorate this important milestone in America's history, a significant and lasting tribute will be issued on that very day: *The 1985 Presidential Inaugural Day Plate.*

Actual plate size is 8½ inches in diameter.
Fleetwood, a division of Unicover Corporation, is not affiliated with the U.S. Government or Inaugural Committee.

A shimmering tribute to America's Presidency

The 1985 Presidential Inaugural Day Plate is an extraordinary tribute to America's Presidency. For it combines a seldom seen combination of superb artistry — shimmering *24-karat gold* and *lustrous Cobalt Blue* on fine porcelain.

First fired on porcelain centuries ago, the deep blue beauty of Cobalt Blue is undisputed . . . but exceedingly difficult to achieve.

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To create a design for *The 1985 Presidential Inaugural Day Plate* of an elegance appropriate to both the medium and the historic occasion, Fleetwood turned to the noted British artist Jeffery Matthews. A master of the arts of calligraphy and heraldry, Jeffery Matthews has conceived an elegant design in 24-karat gold of imposing beauty.

In addition, each plate will be decorated with a band of pure 24-karat gold and will also bear the artist's signature on the back stamp in the same 24-karat gold. Furthermore, each plate will be hand-numbered and accompanied by a Certificate of Registration and Authenticity, display stand and a booklet about Inauguration Day 1985.

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The 1985 Presidential Inaugural Day Plate can be issued *only once* and only in a very limited edition of 9500 with a further limit of two plates per collector. All commissions *must* be accepted on a strict first-come-first-served basis . . . and once the edition limit has been filled, there can be no more. Significantly, the first plate . . . Number 1 . . . will be presented to President Reagan.

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☐ **DIRECTLY.** I enclose $25 for each plate ordered and will be billed an additional $25 for each plate with shipment. Total remittance enclosed: $_____

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feature in his grand illusion—the dramatic hoax that, it is now clear, he was by then planning with meticulous care. He boldly invented personalities for himself and his wife, contrived to safeguard the privacy of "Gladys Maud Cockburn-Lange," legally covered his tracks, and wrote *Death in the Air*.

Grosz and Schneide discovered snapshots of Archer and his friend working with airplane models. The sleuths believe that pictures containing a lot of planes (one of the most used photos has 14—count 'em—Allied and German warplanes all over the sky) were done by shooting two or three at a time and then superimposing the negatives for re-shooting. Photo researchers have detected traces of the suspending lines that held the models in position and were then retouched out.

Interestingly, Archer's honest photos of the war, taken while he flew with the RFC's 40th Squadron, are excellent. He was a facile writer. His letters are voluminous, descriptive and entertaining. It must have been great fun sitting there in Nyack, writing *Death in the Air* with its telegraphic style, its understated heroics, its flyers' slang. Reading it, you get to know the squadron: Jock, Canada, Mick, Chilly, Tod, Rex, Kaffir and all the others. When one is missing after a run-in with the enemy, you suffer. When the author gets depressed and hits the bottle, you worry. When he meets a girl, you cheer.

As for the photographs, they are more impressive in the context of the book, though some are far less convincing than others. Your reaction to them varies with your experience. My own recollections of air combat include the sight of the smoke that streamed away from fighter planes when they fired their guns. I hadn't expected this, and in my first combat, a wild "soiree" (Archer would have loved that bit of World War II idiom) one bright morning over New Guinea, I remember seeing that plume of smoke feathering away behind a diving P-38. I was certain he'd been hit, but he was just firing his guns. Surely this sight would have been equally noticeable 25 years earlier. Archer has not one picture showing gunsmoke.

The photographs fooled plenty of old pilots, just the same. According to the Archer documents many prints were sold, or sometimes given, to a long list of people and associations. Many names ring a bell. In the 1930s, Charles John Biddle of Philadelphia, formerly a pilot with the Lafayette Flying Corps and author of *The Way of the Eagle*, bought a couple of Cockburn-Lange photos for $20; so did one of the New York Whitneys, while a Wilmington du Pont put up $230 for 23. The name of Tommy Hitchcock jr., polo star and playboy of the '20s and '30s, is on the list. He bought seven. Alan Villiers, famed seagoing author and photographer, bought eight.

Two more American flyers acquired some photographs: Douglas Campbell and Reed Chambers. Campbell was one of the very first pilots of the American Air Service to shoot down enemy planes after the Yanks had come over in 1917. He ran up a score of six before copping a wound that grounded him after the Armistice. He bought three Cockburn-Lange prints.

Reed Chambers flew with Rickenbacker and Campbell and scored seven victories. He is listed in the Archer documents as having been *given* 32 prints. The Archers must have considered him a special case—at any rate, he's the only person to report visiting and talking to Gladys Maud "Cockburn-Lange." A letter in the Archer collection tells how he met her in Greenwich Village, was "flabbergasted" by the photos that she showed him and swallowed completely her tale of how they were taken.

In 1945, Chambers met her again, this time in Havana. He later described her as "a typical, shy English woman and extremely modest." He was sure she had made nothing from sales of her late husband's book. Chambers apparently believed firmly in her authenticity, and that of the photographer, until his death in 1972.

"Tiny—but with the heart of a lion"

The *real* Gladys Maud must have outdone herself to give the old hero such an impression of shy modesty. Betty Archer was English, all right: a Yorkshirewoman. But she was a long way from the retiring creature Chambers thought he knew. During the first war she volunteered for the Women's Royal Air Force and became a driver. Her scrapbook indicates that she was an attractive young woman, popular and good fun. The young airmen she drove probably all fell in love with her. Describing her later, Wes Archer wrote, "Tiny, sure, but—she has the heart of a lion."

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While Archer was making his model planes, putting together his scenario and writing his book, Betty Archer got a job as a receptionist and personnel officer at the Sherry Netherland Hotel to help pay the bills. When the couple traveled to England to supervise publication of *Death in the Air,* Betty hired on as European representative of *Vogue* and *House & Garden.* But the hotel experience stayed with her, and apparently she was good at it. For after the pair returned to New York City, she went to the Plaza Hotel and got another job as executive housekeeper—a demanding position.

The couple's daring hoax paid off pretty well. Archer claimed he earned 20,000 Depression dollars from the book. And, perhaps inevitably, most of what happened afterwards was an anticlimax. His story, indeed, evokes a sadness that such great skill and talent achieved so little. During World War II he tried to get into the U.S. Army Air Force, but was turned down because of a hernia. In 1945 he briefly became associate editor of *Scientific American.*

Soon after that, the Archers were down and all but out. Betty was executive housekeeper at an Atlantic City hotel; Wes had a book manuscript rejected by two publishers. He was jobless and ill, living in an unheated Greenwich Village shack on Horatio Street. In a desperate attempt to improve his health and their fortunes, the couple moved to Havana in 1952. Betty took the same kind of hotel position at the Nacional that she had in Atlantic City. Wes suffered a slight stroke and became entirely dependent on her. Finally, in 1955, he died. The Havana post of the American Legion buried him with full military honors.

Personal photographs suggest that in his salad days Wes Archer had cut a rather glamorous figure, attracting a coterie of friends. At the end, most had drifted away. Only John Charlton remained, the friend he had known literally all his life. "Wes was like a brother to Jack," says a handwritten note in the collection. So it was to Charlton, back in Gloversville, that Archer had sent his copious and carefully kept memorabilia. There they remained for 31 years.

Betty Archer—Gladys Maud Cockburn-Lange—forsook Cuba when she found life increasingly difficult under Batista. She moved to Puerto Rico, again holding an important hotel position. Steadfastly, she kept the family secret of the fabricated airman and his startling photographs. When she died in 1959, it was still safe with her.

In 1981, Sandy Colton, director of photography for the Associated Press, heard about some fabulous World War I flying pictures right in Gloversville, where he had a log cabin. It was easy for him to follow up. And when he saw the Cockburn-Lange Collection, he realized it was valuable and contacted Walter Boyne, Director of the National Air and Space Museum. John Charlton, then 86, agreed to entrust Archer's belongings to the Smithsonian. He was quite unaware that the photographs had any special significance, that mystery haunted them and that it would finally be solved.

"You know," said Karl Schneide, looking up from a desk buried under Wesley Archer's writings and photographs, "the Archers were really good people in their way, and their hoax was a genial one. You have to admire them both."

The real Gladys Maud Cockburn-Lange was Archer's wife, Betty, shown in 1918 before their marriage.

As a pilot with the Royal Air Force in World War I, Archer struck a theatrical pose with faithful S.E.5.

The giant Atlas moth can have a wingspan of ten inches or more but has no mouth or digestive system.

By Timothy Green

Beautiful fliers fill an indoor jungle in suburban London

Hundreds of moths and butterflies from around the world thrive in a greenhouse; now one is planned for the United States

It lives its adult life span of ten days or so off the fat stored as a caterpillar, concentrates solely on mating.

The transition is as abrupt as a theatrical curtain rising on some magical, faraway scene. One moment you are in the cool, fresh breeze of a London afternoon, the next you are in the humid heat of a tropical rain forest. The broad leaves of banana trees mingle with hibiscus, heliotrope, passionflower, African marigold and oleander; bamboo and an acacia tree sprout beside a pool where terrapins laze in the heat on the rocks. And above, a kaleidoscope of butterflies of every shape, size and color performs an endless aerial ballet. Over the pool three little black-and-white sailor butterflies float around each other like old World War I planes circling for position; nearby, two Australian orchard swallowtails flutter through an elaborate mating display. On the ground below them, a black great Mormon from Southern and Eastern Asia drinks from a puddle created by a recent "monsoon" from overhead sprinklers. And in the shade of a honeysuckle arch, two brown owl butterflies from Brazil, with fake owl-like eyes on their wings to deceive their enemies, are dozing the day away, for they confine their flying to dawn and dusk.

A lepidopterist's delight in Syon Park

This steaming jungle at the London Butterfly House, located on the grounds of Syon Park in suburban London, is today the home of the world's largest collection of live butterflies. As many as 100 species from temperate and tropical climates have been brought together by an eager 38-year-old lepidopterist (and sometime lawyer), Clive Farrell. Since it opened in 1981, the Butterfly House has lured a quarter of a million visitors a year to mingle with the 500 to 600 butterflies flying around them in the open flight area (to say nothing of a host of creeping caterpillars and dormant chrysalides).

The concept of the pioneering London house is very simple. Within a huge glass greenhouse, about 10,000 square feet in area, Farrell has reproduced as closely as possible the environment of a tropical rain forest. The temperature in the daytime varies between 75 and 95 degrees F (tropical butterflies need a temperature of at least 70 degrees to fly), and at night is never allowed to fall below 60 degrees. The humidity, aided by Farrell's sprinkler-spawned monsoons, is usually up to 80 percent. And Farrell and his staff have planted their hothouse with a carefully chosen balance of vegetation to provide flowers that are rich in nectar for butterflies to feed on, and leaves on which they will then lay their eggs and which the emerging caterpillars will happily devour. The caterpillar, Farrell explains to visitors, is a fussy eater; it may die rather than munch anything but its accustomed leaf.

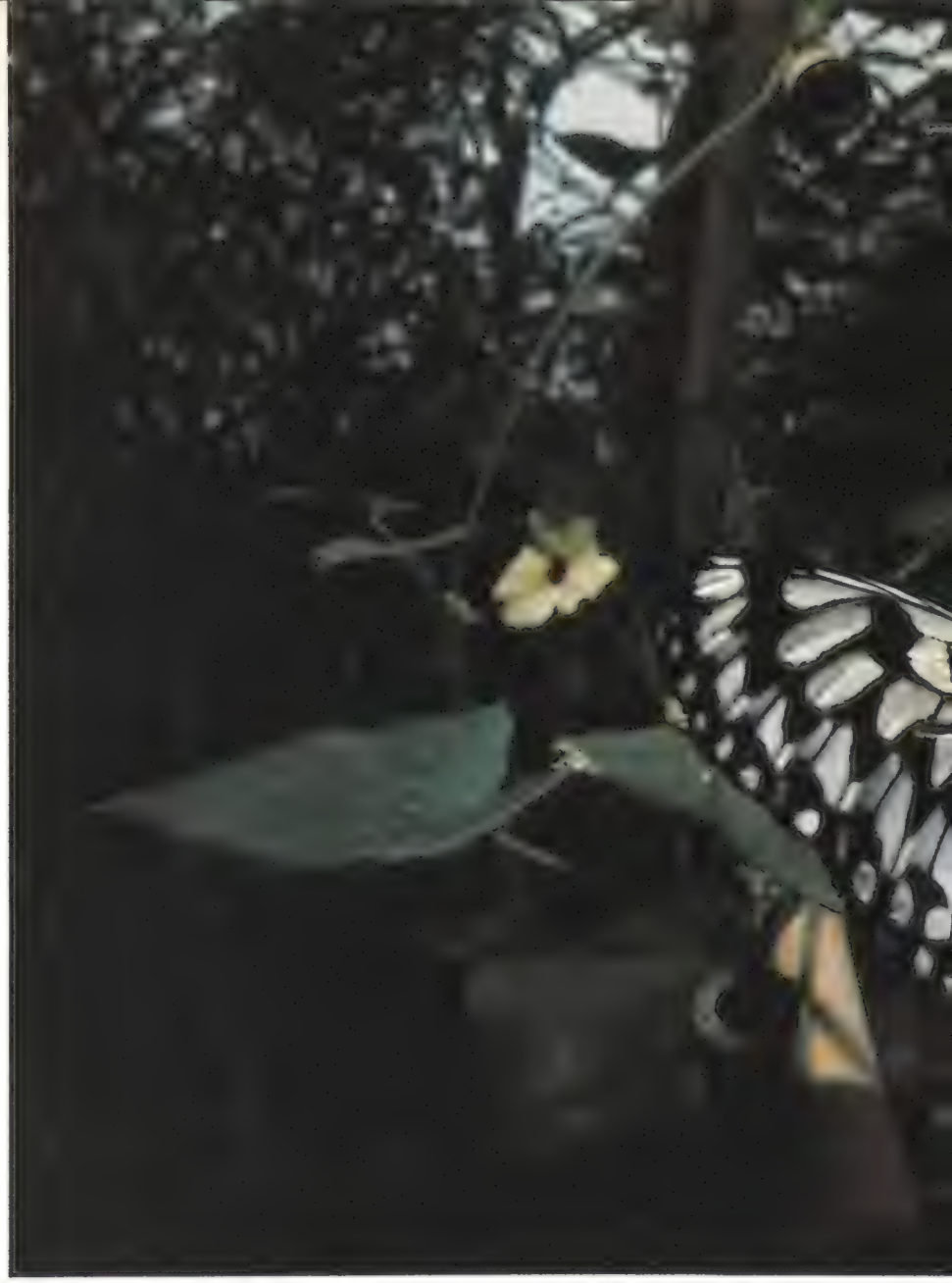
The whole trick in establishing a butterfly house is to match species to food plants. "The number one vital ingredient is having the right plants, particularly for the caterpillars," says Farrell. "I've tried to identify and then obtain the food plants of every species we have. For instance, I've just had 2,500 citrus bushes flown in from New Zealand to please the tropical swallowtail caterpillars."

Such attention to detail, of course, simply gives Farrell a chance to indulge his lifelong love of lepidoptera. "When I was about six I found a big hairy caterpillar of a garden tiger moth," he tells me, "and like thousands of children before me, I picked it up and

Photographs by Geoff Tompkinson

Beautiful fliers in a London greenhouse

Clive Farrell, founder of London Butterfly House, meets an Indian moon moth (top) and a giant Atlas.



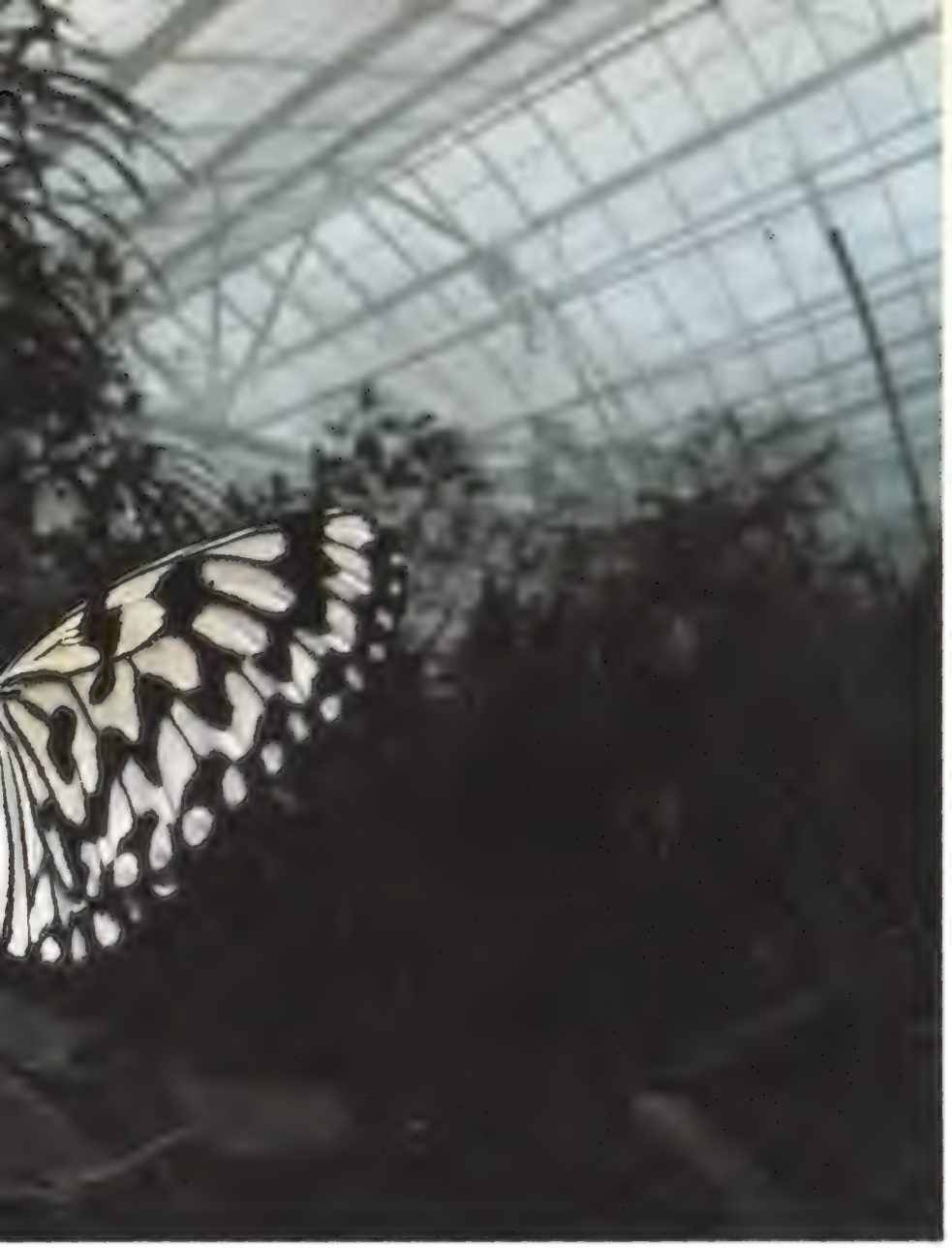
This tree nymph, also known as the paper butterfly, is one of many brilliant species from the Philippines.

put it in a matchbox. Soon it turned into a chrysalis, and then one day I just happened to be around when it hatched out in our garden shed. I watched it crawl out of its cocoon and dry its wings. It was one of those magic moments as a child. Since then, moths and butterflies have never lost their fascination."

Indeed, their preservation in increasingly hostile environments both in Britain and in the rain forests of the tropics has become something of a crusade for Farrell. Throughout our conversations he kept returning to the underlying theme that is really the motive behind the whole scheme. "The idea is to teach people by example," he explains. "This Butterfly House is the nearest thing to a tropical rain forest that the vast majority of the population will ever come to, but it may nudge their concern about the way in which that forest is being destroyed. I believe it is vital that masses of people become concerned before things can change for the better."

Moreover, building up expertise in breeding butter-

London-based Timothy Green is a regular contributor. A revised edition of his The New World of Gold *was published last October by Walker and Company.*



The 10,000-square-foot greenhouse is always kept at the temperature and humidity of a tropical rain forest.

flies in captivity ensures their preservation. "We are making sure," says Farrell, "that it's never too late to breed them in large quantities for release." But when he first floated this idea, after seeing butterflies being bred in a small hothouse on Guernsey, one of the Channel Islands, some entomologists and horticulturists scoffed. "I was told that the butterflies would not fly, and anyway the place would soon be rife with a ghastly range of plant pests like red spider, whitefly, mealybugs and aphids," he remembers, "because we couldn't use normal insecticides."

His solution—applying natural biological controls—is apparent as soon as you enter the Butterfly House. Just inside the entrance is a cluster of carnivorous plants such as the Venus's-flytrap and sundew, which trap insects with sticky, dewlike blobs of fluid. Three Chinese painted quail, which rarely fly and so are no threat to butterflies, are pecking their way quietly through the undergrowth, lunching on ants and spiders, while a dark red Australian ladybird patrols a clump of African marigolds in search of mealybugs and scale insects.

With such hazards controlled, if not eliminated, the business of establishing a thriving butterfly population could proceed. From the start, Farrell found that entomologists throughout the tropics responded to his requests both for chrysalides and sometimes live butterflies. "My anchorman is David Goh in Penang," says Farrell. "He has a network of agents throughout the Cameron Highlands of Malaysia. Previously they were collecting for the dead-stock trade, but he has trained them now to keep a number of butterflies alive, and he's also got a staging post for chrysalides in his garden." The live butterflies are sent by air, individually packed in soft envelopes with a pad of wet cotton. When they arrive at the Butterfly House, they are revived on trays of cotton soaked in a sugar solution to give them instant strength. Usually up to 85 percent survive the journey. The chrysalides also arrive packed in moist cotton, of which every single strand has to be carefully removed so that there is no hindrance to the butterfly when it emerges, for its wings could easily be crippled.

Among the first live butterflies to flourish was a female of the lesser wood nymph from Malaysia, which successfully laid eggs within a few hours of arrival. "We were able to observe the eggs, caterpillars and chrysalides," recalls Farrell, "and then to breed two more generations."

Depending on the species, its global location, the local seasonal and climatic conditions, the life span of a butterfly may vary from two weeks to more than a year. The Heliconiidae family of butterflies from tropical America are known to survive up to six months because they digest protein-giving pollen as well as nectar. Most butterflies usually live only for two or three weeks after they emerge from the chrysalis, so establishing a satisfactory life cycle swiftly is essential. That means having the right plants. "People often ask me, What do I need to attract butterflies?" says Tom

Live butterflies from Malaysia are unwrapped and placed on sugar-soaked cotton to regain their strength.

Fox, curator of the Butterfly House. "I always reply, What butterflies do you want? Decide that first and then get the right plants."

On a recent trip to Trinidad, Fox himself secured an obscure climbing vine which is the favorite diet of the caterpillar of one of the South American blue morpho butterflies. "Now we've got six small healthy vines established," he says, "and soon we'll have a go at breeding this blue morpho." On the same expedition Fox rounded up a male and female cracker butterfly (so called because it often crackles like a spark of high-voltage electricity when chasing off other butterflies intruding on its territory), and brought them safely back to London. Within a week the female had laid eggs. "We've now got 30 caterpillars," says Fox, turning up a leaf to reveal a spiny brown-and-black caterpillar quietly feeding on the underside. "If they all survive, we'll have a tremendous crackling."

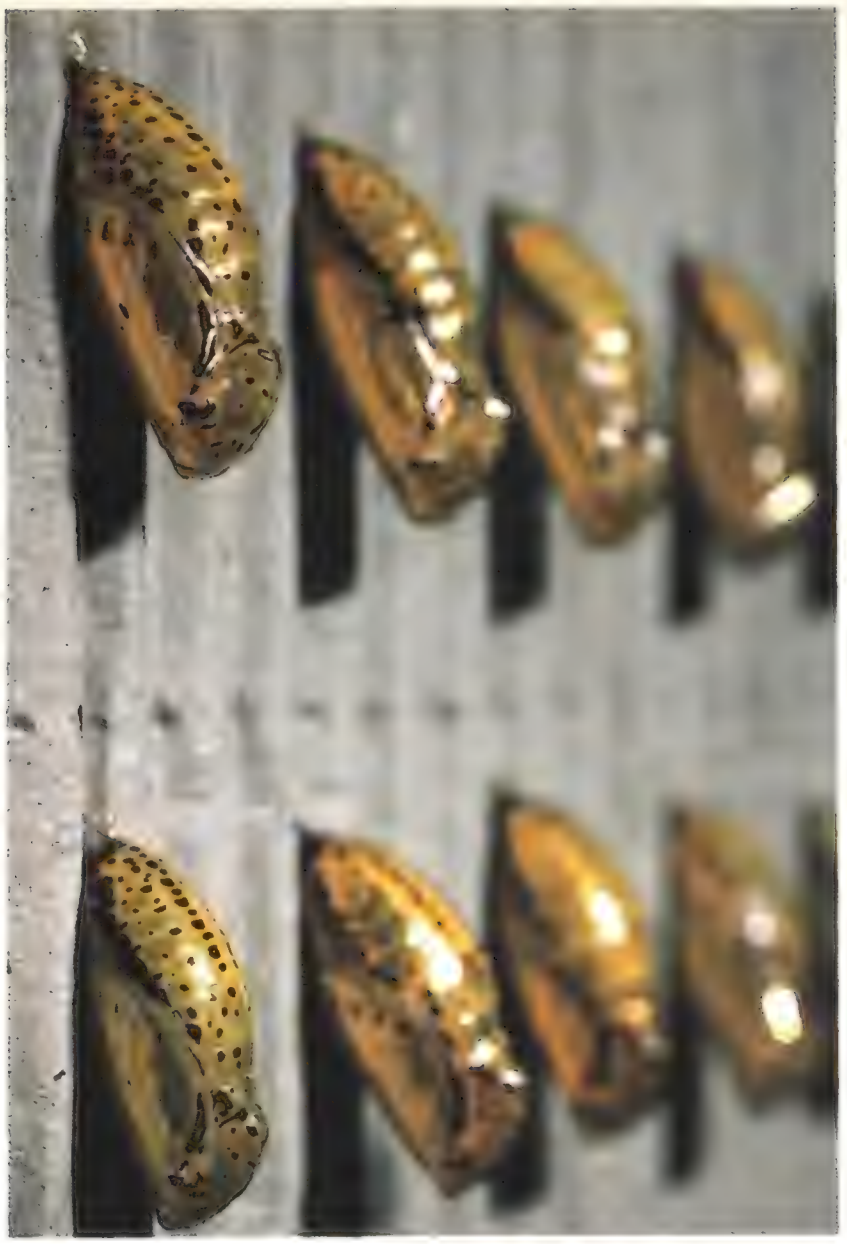
Although the immediate spectacle of the Butterfly House is in the air, the leisured and observant visitor can see just as much action going on under the leaves of close to 100 varieties of plants thriving in the steamy environment. As I went through with Tom Fox, he first raised the broad leaf of a banana tree to reveal minute batches of white eggs from the South American owl butterfly on the underside. Beneath the leaves of a passionflower we chanced upon the caterpillar of a lacewing butterfly being attacked by a brown spider. "The lacewing lays its eggs on the tendrils of the plant, but the caterpillars all congregate under the leaves," explains Fox.

Not all the caterpillars were out of sight. Caterpillars of the monarch butterfly with their off-white, black and yellow stripes were sprinkled all over a patch of milkweed that had been virtually stripped bare by their voracious eating. Nearby we observed the green caterpillars—as big as your thumb—of the Indian moon moth draped all over a rhododendron shrub, munching out great swatches of the leaves, the ceaseless side-to-side motion of their heads like an old-time reaper in a cornfield.

Chrysalis collage will produce a bevy of beauties, including the golden birdwing (yellow, center right).

A gardener copes with the "domestic monsoon," used to give tropical butterflies the humidity they need.

The appetite of the caterpillars is notorious, far surpassing the ability of plants to grow. Indeed, it is an old adage among lepidopterists that if a six-pound human baby put on weight at the same rate as the monarch caterpillar, the baby would reach eight tons within two weeks. So the Butterfly House gardener is constantly having to replace plants (chiefly from a 20-acre nursery at Farrell's country home), or at least control the butterflies' access to them. Along one side of the hothouse, for instance, a range of Amur cork trees, beloved by swallowtails, is curtained off with a net for part of the time to prevent the butterflies from laying too many eggs. Even so, the cork trees played host to plenty of distinctive green swallowtail caterpillars, whose tails are puffed up into a phony head—complete with "eyes"—to fool an enemy into attacking the wrong end. If attacked anyway, they respond with a pungent odor like rotting pineapple from an organ behind the head. Besides such defenses, the swallowtail caterpillar, like most other caterpillars, sheds its skin



Chrysalides must be hung the way they are in nature, so the emerging butterflies do not injure themselves.

four or five times: it spins a silken pad on a leaf, anchors its outer skin to the pad and then wiggles out in a fine new coat.

Once caterpillars pupate into chrysalides, the Butterfly House often puts them in "emerging" cages, particularly if they are of special importance. In the cages they are laid out or hung in especially humid conditions. It is vital that chrysalides imported from overseas (the major source of supply because live butterflies can only be sent occasionally) are held in the emerging cages because they may well have been infested with tiny parasitic wasps in the tropics. For those wasps to hatch and escape into the open of the Butterfly House would endanger the entire collection.

Many chrysalides, however, remain scattered under the leaves of plants. Beneath an oleander leaf Farrell located the chrysalis of a crow butterfly hanging like a delicate silvery-gold bell. And he recalled a spectacular show one morning when a host of grass yellows hatched simultaneously from their chrysalides and hung from the feathery leaves of an acacia while drying their wings. "We don't know why they all hatched at once," says Farrell, "but it may well be a defense mechanism so that some at least will survive predators."

One of the greatest pleasures for a lucky visitor to the Butterfly House is to chance upon that moment of birth from the chrysalis, when the emerging butterfly, its wings dripping and crumpled, inflates them with a tiny "pump" in its abdomen and then sits patiently in the sun waiting for them to dry.

The priority for the full-fledged butterfly is an ample supply of nectar. Farrell concentrates such nectar-rich plants as lantana, Hoya, pentas, marigold and buddleia into certain corners which he calls butterfly pubs. "You have to go not only for flowers that are heavy in nectar," he explains, "but also those with the right structure, a short tube for a butterfly's strawlike tongue, its proboscis."

Special appetites are also catered to. Bunches of dried ragwort are hung around the flight area to provide the alkaloids that many butterflies, such as the striped blue crow, require to manufacture pheromones (chemical stimuli) for their mating. The butterflies scratch the surface of the ragwort with their feet, and secrete an enzyme through their proboscises to dissolve the plant tissue. They then suck up this "soup."

The plant diet is also supplemented by bowls of rotting apples, bananas (sometimes laced with rum), pineapples, plums and pears placed around the Butterfly House. "The butterflies get to know where the fruit is, and they congregate there every morning," says Tom Fox. "I don't mix the fruit because some butterflies like apples, some prefer bananas." The owl butterfly has a special weakness for the rich aroma of banana and rum.

However good the food sources, the real hurdle for the Butterfly House is the English winter. It is not just the damp cold, which makes the cost of maintaining tropical heat in a large greenhouse prohibitive, but the lack of sunshine, which results in light levels so low that flowers will not bloom abundantly enough

In rare cases, hand mating is attempted. The scientist must know correct position for the species concerned.

Butterflies dine on trays of cut-up, overripe fruit—here, apples; also bananas, pears, plums, pineapples.

A young visitor is not quite sure how to respond to a butterfly that has come to alight on her wrist.

to provide nectar. So only a small breeding stock is retained from December through February and carefully nurtured in a double-glazed octagon within the Butterfly House.

The winter hiatus cannot dilute Clive Farrell's delight in the success of his venture. He has just completed a new temperate-zone butterfly house adjoining the tropical one, where he confidently expects to establish a large population of British butterflies. Within the temperate house he has created four main areas. In one corner is his customary butterfly pub with nectar-rich buddleia, aubrietia, goldenrod, French marigold and heliotrope. Nearby is an acid heath area with heather and broom, then a chalk area with grasses and wild flowers, and finally an area of dappled shade.

Around this enclosed environment he has also transformed the exterior walkway to the whole complex into a wild-flower meadow that has become a natural summer honeypot for the free butterfly population of Syon Park. His constant goal is to teach people how relatively easy it is to create their own butterfly garden or greenhouse at home. "You can tilt the environment of a garden in favor of butterflies," he argues, "just by planting wild flowers. We've encouraged colonies of common blues, meadow browns, gatekeepers, red admirals, peacocks and tortoiseshells right here in London." And he wishes fervently that many municipal councils in Britain, who plant what he calls "deserts" of amenity grasslands around housing developments or highways, would discover the virtues of planting cheap wild-flower meadows instead. "You can get a tapestry of color from unpretentious wild flowers instead of those green deserts," he says, "and you need less fertile soil and much less maintenance." The added bonus, of course, is the butterflies, which would thrive amid the wild flowers.

Another Butterfly House, with more to come

Encouraged by his success in London, Farrell opened last April the Weymouth Butterfly Farm in Dorset, in southern England, which already has its own self-sufficient breeding stock. Learning some lessons from London, he has installed more elaborate water gardens, with rushing torrents and deep tropical pools filled with huge Amazon lilies.

He is determined, too, that the pleasure he derives from such sights and his concern for the butterflies' future should be shared beyond the shores of Britain. Already he is planning with a New York entomologist the establishment of an American Butterfly House. As he likes to tell visitors, "Butterflies are universally admired for their beauty, delicacy and gentleness. If they were lost, something would be lost forever in all of our lives."

Variously known as the orange oakleaf or the Indian leaf, this species is noted for its superb camouflage.

As their name implies, lime butterflies are partial to citrus trees, imported for them by Butterfly House.

By Richard Wolkomir

High-tech materials blaze urban trail for outdoorsy duds

What began as a quiet revolution in fabrics for the dedicated camping crowd has become a mainstream fashion phenomenon

The fashion world's coveted Coty Awards usually go to people like Halston, Dior or Saint-Laurent—the glamorous Paris-London-New York designers who dress the elite in confections of silk and taffeta. Three years ago, however, a Coty went to none other than that rusticated antithesis of couture, L. L. Bean Incorporated of Freeport, Maine. It was a glum day Down East. Since 1912, Bean has been purveying such woodsy gear as long johns, boots and yellow slickers to hardy outdoorsmen who are supposed to eat moose, not mousse. The Coty Award was like a slap across the corporation's bristly chin with a silk evening purse. "It's something we try to downplay," admits one employee. Pressed, public-affairs representative Kilton Andrew will acknowledge, as abashed as an Allagash fishing guide caught crocheting, that Bean actually won *two* Coty Awards, the first in 1976. "But it's no big deal," he insists.

On the contrary, fashion experts say. L. L. Bean may grump, but its Coty Awards underscore an intriguing style trend that has become a very big deal indeed: in the 1980s, the outdoors is definitely in. Advertising men are hiking through midtown Manhattan in mountaineering gear and gum-soled hunting boots. High school students all over the country are stalking their hallways in hunter's camouflage and plaid shooting jackets. On ritzy Rodeo Drive in Beverly Hills, shoppers are dashing from boutique to boutique in marathoners' sweat suits. Atlantans who will never hunt rhinos are hosting backyard barbecues dressed in full-safari regalia. Even the President of the United States likes to be photographed in the boots and jeans of a buckaroo.

According to active-sportswear expert Carolyn Harrigan, who teaches at the Fashion Institute of Technology in New York City, the outdoor trend has been growing for some time now. "But in the past five years," she says, "it's really come into its own. Just the other day, teaching a seminar, I noticed that about half the kids in the class were dressed like hunters. And this morning I watched my neighbor leave her house wearing a fuchsia sweat suit."

Mainstream designers have been alert to the action-wear trend. Ralph Lauren recently offered a line of "safari wear." Calvin Klein has been advertising "bleached denim work shirts," which sell for $50 at stores like Bloomingdale's on New York's posh East Side. Norma Kamali's shirts and dresses made of sweatshirt fabric are enormously popular these days with young women.

In Europe, too, Tyrolean hunting jackets are all the rage and many Europeans traveling to the United States seek out L. L. Bean types of clothing. "A company in France is making hunting jackets and fishing vests," says Ralph DiGennaro, who is fashion news editor at *Gentlemen's Quarterly* magazine. "It's terrific stuff that was one of the brightest spots at [last] year's Pitti Uomo fashion exhibition in Florence."

Why do so many indoorsy people want to look so outdoorsy? It is a question that has fashion experts pondering, since large profits are at stake. Explanations range from the technological to the psychological. The operative word, according to L. L. Bean's apparel products manager, Bruce Willard, is *image*. "I suspect that many of the products we sell, particularly clothing, never make it into the woods," he says. "Our customers are probably buying them as much for their looks as for their function. However, we do design and manufacture the items as if they really *are* going to be used in the wilderness."

Fashion editor DiGennaro believes Americans are switching to outdoor fashions partly because such clothing is comfortable, durable, practical and warm even if a north breeze whistles through your patio cocktail party. Others suspect that the burgeoning interest in utilitarian gear may have something to do with the public's psychological preparation for World War III. A less ominous theory traces today's outdoor chic to the backpacking mania of the 1960s. "Now all of those backpackers are grown up," says Gibson

"Advertising men hike through midtown Manhattan in mountaineering gear and gum-soled boots."

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Mann, a designer for Sierra West Manufacturing, Inc. of Santa Barbara, California, a leading supplier of outdoor clothing. "Many of them are business people and they are still attracted to the outdoors but they don't have much time to actually get out. So they want a mountain parka that can be worn in the city, too, and that forces us to design one."

Whatever the reasons for the booming popularity of outdoor clothing, there is no question that the advent of numerous high-tech fabrics in recent years has helped make the improbable possible. Most of the new fabrics were originally marketed for use by campers and hikers in tents, backpacks and specialized clothing, but they were not all developed for that purpose. Take, for example, the entrepreneurial saga of Gore-tex.

During the 1950s, chemical engineer Wilbert L. (Bill) Gore, an outdoors enthusiast since his Idaho childhood, was working for E.I. du Pont de Nemours on polytetrafluoroethylene, or PTFE, a new polymer eventually named Teflon. Gore believed it was a perfect insulator for computer wires, but he could not find a way to form the new material around the wire. One night when he was fiddling with the problem in the workshop of his Newark, Delaware, home, Gore's college-student son, Bob, suggested laminating the wire between two sections of PTFE tape. In the wee hours of the morning, Bob was shaken awake by his excited father, who was shouting, "It works! It works!"

When Du Pont proved uninterested in PTFE-insulated wire, Gore and his wife mortgaged their house, took $4,000 from their savings and incorporated as W.L. Gore and Associates. After a rocky start, the little wire company turned profitable. In 1969, young Bob Gore—now a PhD chemist working for his dad—was trying to stretch PTFE so that he could insu-

Richard Wolkomir's last article for SMITHSONIAN, *on sports and statistics, appeared in the October 1983 issue.*

"Atlantans who never hunt are hosting barbecues outfitted in safari regalia."

late more wire with less material. Extended into a membrane, PTFE turned out to have a surprising property. Its pores were too small for water droplets to enter but large enough to let water vapor escape. That meant that any garment made of the material would shed rain, but would also "breathe," dissipating heat generated by the wearer's body.

Veteran camper Bill Gore immediately saw the possibilities in the outdoor-gear market. Starting in 1976, Gore-tex took the camping world by storm. Today the American outdoors is virtually festooned with the stuff: Gore-tex tents, parkas, skiwear, golf

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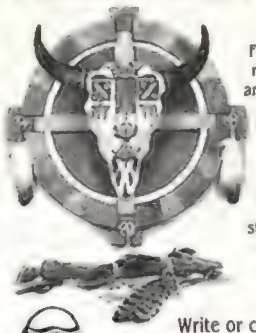

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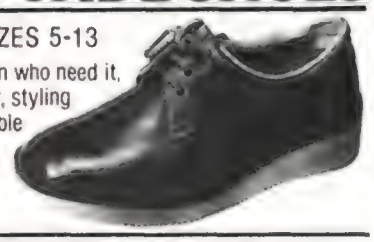

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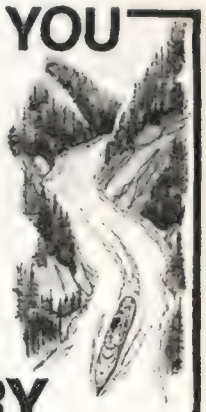

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jackets, jogging suits, hiking boots, hats, gloves, even Gore-tex space suits for the shuttle astronauts. And now, Gore-tex is moving from the wilderness into the city.

Gore-tex is not the only high-tech outdoors material that is making it big in the fashion world these days. Synthetic fibers are replacing natural down in the quilted parkas, jackets and vests that have remained so popular since the 1960s. Corporations like Du Pont, Eastman Kodak and 3M have transformed polyesters and olefins (both petroleum-derived compounds) into filaments that intertwine like down's plumules to trap air, producing warm garments with only a fraction of down's bulk. Initially used in ski togs and camping gear, 3M's Thinsulate now warms such on-the-street staples as London Fog raincoats. High-fashion designer Larry Le Gaspi (whose clients include singers Diana Ross and Connie Francis) designed a red gown with a matching Thinsulate-lined cape. The ensemble costs $2,000. Du Pont's Cordura, a lightweight, high-strength nylon fiber, has been a mainstay in backpacks and hiking boots since the late 1970s. L.L. Bean and outfitter Eddie Bauer, together with several standard streetwear manufacturers, are coming out with new Cordura clothes fit for everyday use.

Although high technology has helped pave the way for outdoor chic, old-fashioned technology hasn't exactly been left out in the cold. "We're seeing a definite resurgence, particularly in our heavy outerwear," says Del Barrows, executive vice president of the Johnson Woolen Mills in tiny Johnson, Vermont. Barrows' company, which has been in his family since 1905, is about as low-tech as the garment industry gets. It consists of a hodgepodge of gray clapboard buildings on Main Street across from a church and the Johnson Auto Parts store. Downstairs, in the cutting room, two men run electric cutting machines over a thick pile of buffalo-plaid wool 33 feet long, cutting out the various parts that will be stitched together to create hunting jackets. Upstairs, more than 20 women operate sewing machines, doing the seams and hems. The room resembles abstract art—here a swath of red-and-black plaid, there a long strip of Robin Hood green and over yonder a pool of gray and white.

"A lot of new customers are buying our clothing because they've discovered that wool feels comfortable, like an old shoe," Barrows says. "But many other people who've shopped in our downstairs store for years are still stopping in." As he speaks, a gray-haired gentleman wanders raptly through the store. With his clipped

"This morning I watched my neighbor leave wearing a fuchsia sweat suit."

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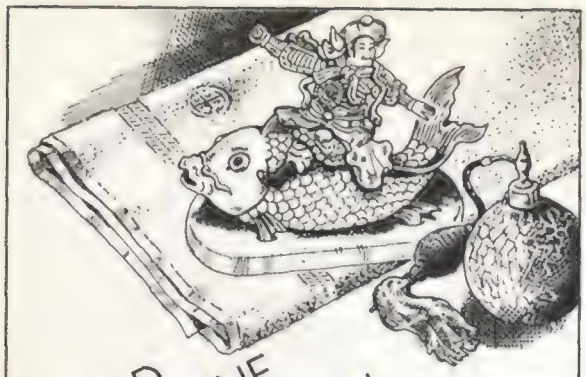

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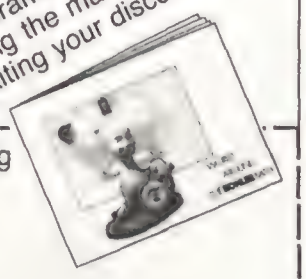

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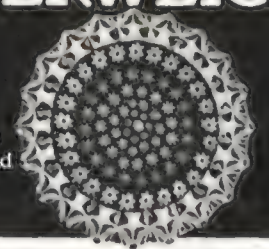

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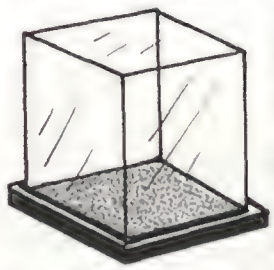

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mustache and tweed Brooks Brothers suit, he is clearly no lumberjack. "Do you have a cap in red plaid, with earflaps?" he inquires, imitating earflaps with his hands.

The current interest in outdoor clothing is really not as new as it seems. Work clothes and sportswear have been influencing fashion for years. Today's suit jackets, for instance, are slit in the back because in pre-automotive days it was easier to sit on a horse if your jacket parted in the back. The boxy, belted country jacket called a Norfolk originated in the early 1880s when the Duke of Norfolk introduced it for hunting. Harris tweed, one of the most rugged of the Scottish tweeds, was woven for centuries on the islands of the Outer

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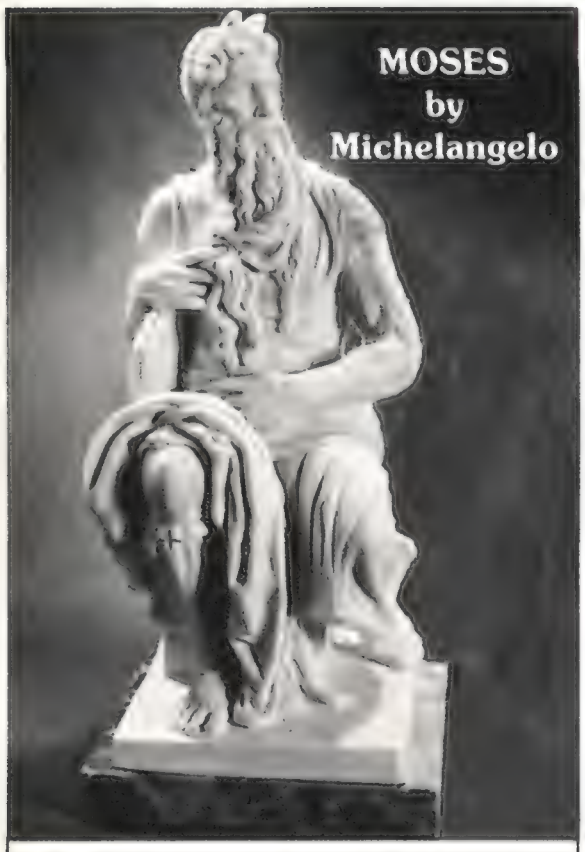
Hebrides and used for blankets, jackets, overcoats and even long underwear to protect natives from the harsh North Atlantic weather. It became popular among the English gentry in the 1840s as the perfect material to wear while shooting and fishing in the cold, damp Highlands. Even warfare can exercise a certain fashion effect.

Take the ubiquitous trench coat. Originally, it was designed for British army officers serving in the Boer war. It later became the more or less official coat of the Allies in World War I. The durable cotton fabric of the double-breasted outer coat was impregnated to resist rain but that did not hinder ventilation. The shoulder straps were for field glasses; the metal belt loops held pistols and canteens. Today, of course, the trench coat is the more or less official uniform of modern commuters, few of whom have any idea what all of those straps, loops and clips are for.

Outdoor work is another traditional trend setter, the best example being the world's favorite trousers, blue jeans. In 1853, a 23-year-old Bavarian immigrant named Levi Strauss sailed from New York to California to make his fortune in the Gold Rush, bringing with him rolls of heavy tent canvas from his brothers' dry-goods store to sell for a grubstake. In San Francisco, young Levi ran into a miner who complained that his pants constantly wore out working his claim. He bustled the miner off to a tailor with his roll of canvas and soon the miner was telling everyone he knew in San Francisco about those tough new pants of "Levi's." A bright guy, Levi wrote his brother to ship out all the heavy canvas and denim he could find. Levi had the fabric dyed a distinctive blue and stitched it into work pants, which sold briskly.

One day, or so the story goes, a tailor told Levi about a miner who was forever complaining that the pockets of his pants ripped when he stuffed them with ore chunks. The tailor had his pockets reinforced with



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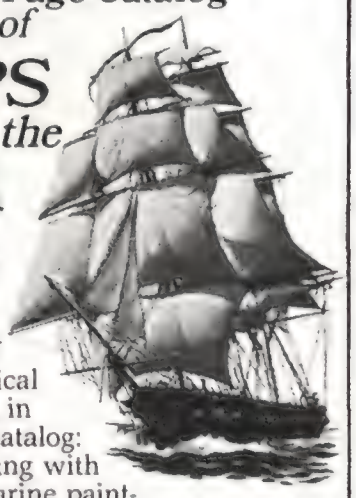

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copper rivets. Strauss bought the idea, patented it and began copper-riveting all of the trousers he produced. The rest, as they say, is history.

Another pioneer in the outdoor-clothing business was Leon Leonwood Bean, a partner in a small Freeport, Maine, clothing store. Bean was a fisherman and hunter who suffered from cold feet. He fixed the problem by insulating a pair of ordinary workman's rubbers with felt and stitching leather-boot uppers to them, thus creating the "Maine hunting boot." It worked so well that Bean manufactured more, sent advertising circulars to holders of Maine hunting licenses, and set up shop in the clothing store's basement. That was in 1912. Five years later, now selling wool socks and leather hunting caps, too, Bean moved across the street to larger quarters over the post office. The original store was "a combination of Grandma's attic and a roller coaster," according to one Freeport old-timer, "because of all the tubes that L.L. had leading down to the post office, where his brother was the postmaster."

Today L.L. Bean, Inc., distributes 55 million catalogs annually. And every year more than two million people visit the Freeport store, many arriving by sailboat or private plane. "We recently had a couple from Alaska in the store," says Bean's Kilton Andrew. "They were visiting relatives in Wisconsin and decided that, 'being in the neighborhood,' they should fly over." A few years ago, when the Anglican Church held an international meeting in Washington, D.C., Japan's Anglican Primate arranged a special trip all the way up to Freeport in order to do some shopping at L.L. Bean's.

Bean's status as something approaching a national institution is augmented by two recent best-selling parodies of its catalog. *Items from Our Catalog* and *More Items from Our Catalog* offer "customers" such things as Swiss Army Earrings, the Social Climbing Shoe, the Sport Tou-

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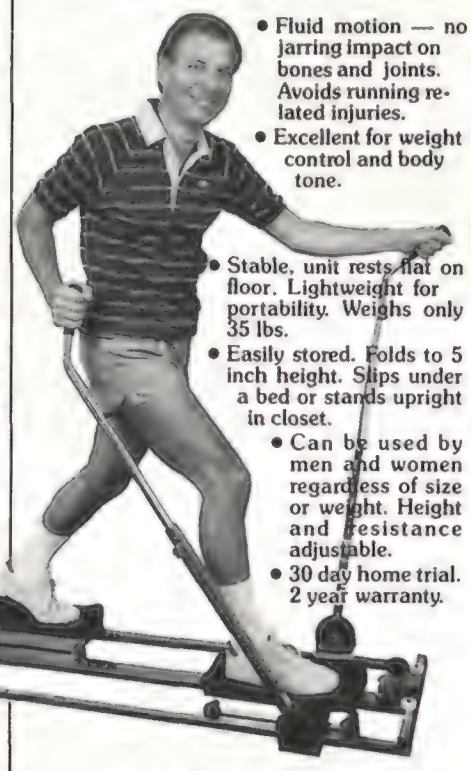

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pee, Thinsulite Papal Vestments, a Down Yarmulke, and Dress Waders which are described as "a serviceable pant for formal wear in swamps, bogs, and streams." The creator of these divertissements is actor-director Alfred Gingold, who says: "I'm a New Yorker, but that never stopped me from reading L.L. Bean. It's big stuff here in the city for a lot of people and right now, even as we talk, I'm wearing L.L. Bean pants."

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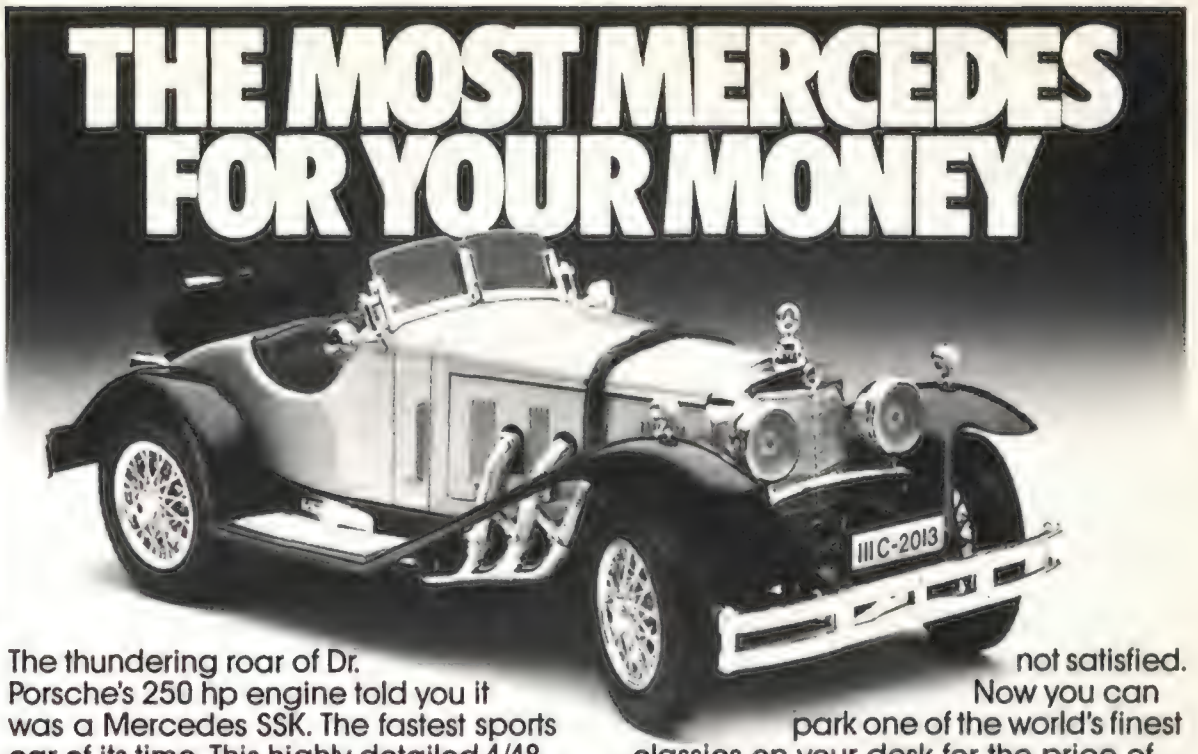

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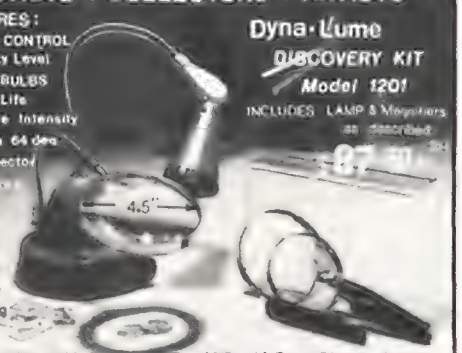

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hunting and fishing outfitters. John Emrick is president of a major mail-order outdoor outfitter, the Norm Thompson Company of Portland, Oregon, which was started in 1949 to sell trout flies by mail. Two years after he joined the company in 1965, fresh out of the University of Portland, Emrick realized that fewer and fewer customers were interested in hunting and fishing. "That's when we started to shift to country-living clothes," he says. Today, sales of such clothing account for about 75 percent of the firm's business.

The Orvis Company, a prestigious outfitter in Manchester, Vermont, began as Charles Orvis' rod shop in 1856, making it America's oldest continuously operated tackle shop. Orvis still sells fly-fishing gear, but it also sells much more, operating out of a complex of industrial warehouse buildings whirring with computers. Orvis began branching out in the early 1960s, selling hunting clothes and equipment, general outdoor wear and country-casual clothes. "We also have sportsmen's gift items, like tumblers with outdoor scenes," says a buyer with the company. "We don't do poodles, but we do have things with Labrador retrievers on them."

While Bean, Orvis and other companies were developing their mail-order businesses, an elegant New York City sporting-goods store was catering to a more elite clientele. That, of course, was the storied Abercrombie & Fitch emporium on the corner of Madison Avenue and 45th Street in Manhattan. Housed in an eight-story building with high ceilings and dark woodwork, it resembled a museum as much as a store. Abercrombie's, as it was known to its regular customers, sold everything from deep-sea fishing gear, shotguns and fly rods to safari clothes, wildlife art, yachting paraphernalia, kayaks and dog leashes. At one time it had a shooting range in the basement and a fly-fishing pond on the roof. In its heyday, from the 1920s through the 1960s, the store ex-

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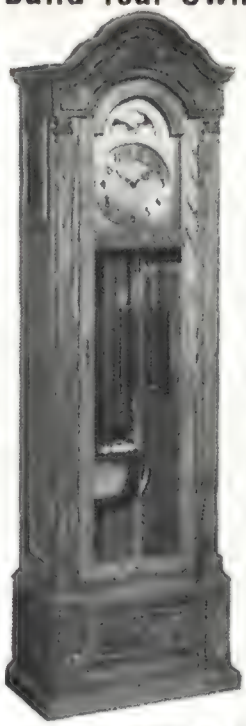

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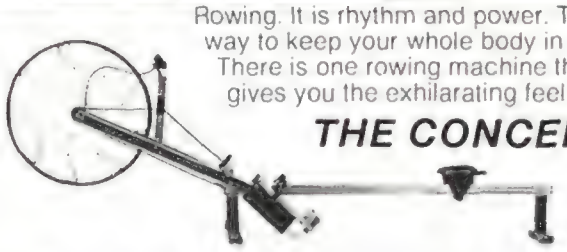

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vator about polo, shooting ducks and fishing for marlin. It was a quintessential Abercrombie's episode.

Abercrombie's was admired by ordinary people, too. Many editors, advertising men and business executives loved nothing better than to spend a long lunch hour strolling its aisles, looking at the merchandise, gabbing with the ever so knowledgeable salesmen—and occasionally even making a purchase. In the 1970s, the store tried to broaden its appeal. "It's my opinion," chairman Harry Garner Haskell jr., observed, "that over two-thirds of businessmen are sportsmen and the more they look like sportsmen, the better they'll like it."

Haskell was probably right, but it was too late. Many of Abercrombie's upscale patrons had long since moved out of the city to the suburbs and the store was unable to capture a younger, more cost-conscious market. A nationwide chain by the same name is still in business today, selling a less expensive line of merchandise, but the New York store went bankrupt in 1977. "It's the one store that men have missed more than any store that ever departed from the city," laments the sports artist John Groth, who had shows at Abercrombie's and was a regular customer there.

There is no question that Abercrombie's was a precursor of the current sportswear fad, but unlike A&F many of the newer purveyors of action-oriented clothing never sold anything else. They are, in effect, sporty boutiques. Mel Ziegler, a reporter for the *San Francisco Chronicle*, founded Banana Republic in 1979 with his wife, Patricia, a fashion editor, hoping to capitalize on their hobby of collecting old military-surplus clothes from the former British colonies. Now, with eight branches thriving in California, they are opening new stores in Dallas, Miami and several other cities. Banana Republic's exotic catalog of items like Bombay shirts, hooded jungle vests and French Army

bush hats includes product reviews by such notables as novelist Martin Cruz Smith, the author of *Gorky Park*. "Our customers are 'outdoorsy' in the British country-gentleman sense of going for walks," says Ziegler.

Such people can be found in throngs at Manhattan's Hunting World, which sells safari gear. One of the store's owners, Bob Lee, is a research associate with the University of Kansas' natural history museum and a veteran bush tramper. One of his recent expeditions was to the 20,000-foot level in China's Pamir Mountains, where he collected three rare Marco Polo sheep for study. On his expeditions, he field-tests the clothes and equipment that he designs for Hunting World. Meanwhile, his partner, former high-fashion model J.C. Head, takes care of the different needs of Hunting World customers who will never wield a weapon more powerful than a swizzle stick.

"Hunting gear is the sexiest clothing you can wear, even if you're an accountant with thick glasses," says Head, showing a journalist through Hunting World's museumlike interior, where statues of Cape buffalo glare menacingly at displays of Swiss Army knives and expensive luggage of exotic hides. Draping her visitor, a quintessential indoor type, in a Kenya Club bush jacket, she rolls up the khaki sleeves, just so. "No, no, you *tie* the belt in front, never buckle it," she says, turning up the collar and plopping a rakish French desert-ranger hat on her guest's head, strapping up the brim on one side only. "Look in the mirror!" she commands. "Now, here's a guy who has been somewhere, done something—I wonder what?"

Romantic-sounding though it may be, safari gear can cause a certain amount of consternation when its popularity reaches a peak. Not long ago, Head recalls, Time Inc. summoned all of its far-flung correspondents to New York. More than 300 of the 370 people at the meeting showed up carrying identical tote bags from Hunting World. "There was mass confusion," Head says, "until they put name tags on them all."

"Hunting gear is the sexiest clothing you can wear, even if you're an accountant with thick glasses," she said. "*Look* in the mirror!"

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Book reviews

The Falconer of Central Park
Donald Knowler
Karz-Cohl, $14.95

When Donald Knowler, a British journalist fresh from a stint in Africa, found himself on assignment in Manhattan a few years ago, he visited Central Park nearly every day for a year.

The park was a logical choice for a naturalist stuck in the busiest city in the world. Housed in the 843-acre preserve—"backyard for three million New Yorkers"—are a wide variety of animal life, 28,000 trees, and a great deal of statuary, including the statue that gave the book its title. Because of the migratory traffic along the Atlantic flyway, the park's bushes and marshes contain, possibly, as wide a variety of birds as one might encounter in Africa.

In *The Falconer of Central Park*, his first—and one hopes not last—book, Knowler takes us along with him on his trips to the park, from January freeze to freak April storms to sultry August drippiness to crisp October sunsets, month by month. Through the eyes of the author as bird-watcher we spot such rare finds as osprey, yellow-breasted chat, Icelandic gulls. These and more than 100 other birds he duly recorded in the bird register in the park's boathouse.

Knowler truly has a talent for descriptive accounts of wildlife. As in one of the many accounts of predators in the park: "with the screaming chickadee in its talons—slowly, powerful flaps were employed now as the kestrel and chickadee rose through a gap in the branches . . . with precise, hooked beak, he bit into the neck of the chickadee."

But *The Falconer of Central Park* is more than a birder's account and probably more than the author should have attempted. Between brilliantly sketched accounts of herons in the boat basin or blue jays protecting their eggs from nest-raiding squirrels, Knowler attempts to salt in accounts of the more human habitués of the park. An out-of-work Pennsylvanian called Chuck, a fellow birder named Lambert and other, nameless, "regulars" became his companions. And there's the cat Knowler calls Billy, "cold green eyes, wire-whiskers and big, rounded white patches on a glossy black coat."

Finally, we meet the statue, *The Falconer*, refurbished and glowing after years in storage, his noble falcon poised to fly aloft. "In early December," Knowler tells us,"a crane lifted *The Falconer* into place on his plinth . . . . and the blue jays began to bypass this corner of the park, believing the raptor was about to launch into the air and fly wild and free."

All fine, except it doesn't work. Chuck becomes a two-dimensional caricature of a hobo type, who in the end goes to Philadelphia, to be "nearer my kin." Lambert, a taciturn naturalist, shares his love of birding but fails to reveal anything about his personal life to the author. Billy, the cat who stalks the park like a birder—only, in his case, for food—dies, inexplicably, and Knowler sadly buries him.

"Central Park," Knowler writes early on, "the most popular and democratic space in New York, had become my best friend in the few lonely months I had lived in Manhattan." It also gave him 131 birds to add to his life list.

Jeffrey Hogrefe
New York correspondent
Washington Post

American Vaudeville as Seen by Its Contemporaries
Edited by Charles W. Stein
Knopf, $20

From the late 1880s until the advent of "talking pictures" in 1927, the vaudeville stage commanded the American public's delighted attention, providing inexpensive mass entertainment and showcasing the talents of many great performers who would go on to further success in radio, movies and even television. Film historian Charles Stein has here assembled a wealth of colorful materials from the popular press, performers' and entrepreneurs' autobiographies, and show-busi-

ness periodicals into an affectionate and reasonably lively informal history of "our most popular form of entertainment in a bygone era."

The book offers a comprehensive picture of what played best on stage and how actors lived (hand-to-mouth, out of a suitcase), of the business and managerial aspects of the trade, of vaudeville's impact on its public and effect on later entertainment forms, and of what happened to its stars after the combined effects of sound movies and the Great Depression ended its brief ascendancy.

Part I, "Beginnings," traces the histories of early vaudeville theaters and syndicates, and distinguishes the typical vaudeville bill of fare from the cruder tradition of "variety"—which, in effect, it supplanted. Stein includes descriptions

Mae West in 1914: "I had to learn it all firsthand. I didn't get it out of books."

and summaries of representative comedy acts, and quotes contemporary criticisms of vaudeville's tendency "to corrupt, vitiate and degrade public taste" with "suggestive songs and lewd, lascivious jests." His section on "The Golden Years" covers a bewildering range of material: the mechanics of producing nightly shows, actors' attempts to unionize, agitation to improve conditions endured by child performers ("these child-slaves of the stage"), a description of "vaudeville tryout nights" and a recounting of the complexities and dangers of attempting "The Wow Finish."

The best part of the book, "Some of the Great Ones," presents the personal recollections of such immortals as W. C. Fields, Fred Astaire, Mae West, Will Rogers and George Burns—and is anchored by "The People of Vaudeville," a superb summary article by one of the most valuable writers on this subject, Marian Spitzer. It's followed by a section entitled "The Impact on American Life," in which Stein only half-successfully generalizes about vaudeville vis-à-vis the work ethic, and by "Decline," which documents vaudeville's surrender to "The Menace of the Movies" (a piece written by Harold Edwards), and reproduces laments for its passing by the theater critic Brooks Atkinson and the great comedian Fred Allen.

Stein's own Preface and his Introductions to the book's five sections vigorously defend this popular art form against the standard charges of frivolity and vulgarity, arguing that "vaudeville bequeathed to us some marvellous wit and humor and perhaps even a healthy, positive philosophy of life." I think he works overly hard, not just as an advocate of vaudeville, but at examining it from all possible angles. There is doubtless too much material here dealing with production techniques and problems—and there's certainly redundancy among the historical and analytical articles.

The great charm of the book is its focus on memorable personalities—and I wish there had been even more such wonders as actor Bennet Musson's description of "A Week of 'One Night Stands,' " and Mrs. Patrick Campbell's complaint about the indignities she suffered during her American vaudeville tour ("I had to kill a man twice a day and shriek . . . and I was advertised as a 'great tragic actress!' ").

There are other gems: Buster Keaton's very funny recollection of his career as a child star, a marvelous anecdote (from the indispensable Fred Allen) about that "big-time act," Nelson's Cats and Rats, and Milton Berle's rueful remembrance of his busy youth ("geography was one of my favorite school subjects. I knew just

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about every place on the map of the United States, because I had played it"). It's the close-up insiders' stories that are the heart of *American Vaudeville*, and they make it, despite some annoying imperfections and imbalances I've noted, an enjoyable and worthwhile book.

Bruce Allen
Literary critic

A Heaven in the Eye
Clyde Rice
Breitenbush, $17.95

Influenced by anthropology and sociology, historians are growing more interested in the past as viewed by common folk. There is even a special subdiscipline, social history, that utilizes the records left by typical men and women to illuminate the subtleties of technological and social change. But attractive as this approach may seem, it still tends to ignore the people behind the documents.

A Heaven in the Eye represents a more human sort of social history. An autobiographical record of the years between 1918 and 1934, it describes a superficially unremarkable life in a lush and literate way. Mr. Rice is not noted for any special contribution to society, and his journal was intended only to record the details of his earlier years and to help him examine whether his life really had been worthwhile. But chance brought the manuscript to Breitenbush, a small publishing house interested in Western history and literary merit, and three years later we have this remarkable reminiscence.

Rice's account begins with his first job, a summer stint with the Forest Service. That didn't last, however, and when one smart remark too many got him expelled from high school, he found himself employed painting stripes on kitchen furniture. To escape this tedium, Clyde took classes at the Portland Art Museum. There he met Evelyn Nordstrom, who soon became Nordi and not long thereafter Clyde's wife.

When the new husband couldn't get work in Portland he headed south to San Francisco, where eventually he found a job on the San Francisco-Sausalito ferry. Now settled, the Rices bought some land, had a baby boy and built a small house. Clyde advanced to second mate and had prospects of further promotion, but his wish for independence intervened. In October 1929, with remarkably bad tim-

ing, he quit his job and bought a share in a fishing boat.

The cold and damp life at sea precipitated a bout of tuberculosis, Rice lost his stake in the boat, Nordi began a long-term affair and Clyde couldn't find work anywhere. A goat-farming scheme failed. And when he got a job with the company building the Golden Gate Bridge, a cofferdam failed and he was laid off again. Nordi left with her lover, and although Clyde dragged her back it was to no avail. After a miserable return to Portland in 1934, it became clear that the marriage was finished. The tale ends here. The book jacket tells us that Rice lives near Portland still, in a "rammed-earth" house he built.

If this book weren't so openly autobiographical it would be greeted as a fine first novel. It is an engaging story eloquently told, where seemingly unrelated episodes unite to characterize the tale's central figure and reveal the flaws that foretell his fate. It is no surprise that *A Heaven in the Eye* won the 1984 Western States Book Award for Creative Nonfiction. Nevertheless, I found it even more interesting for its depiction of life in the 1920s. Under the guise of introspective examination, Rice has produced a superior piece of social history.

His story is a powerful reminder of how times have changed. The alphabet soup of the New Deal and the programs of the Great Society have had a tremendous impact on the quality of our lives. Transportation is vastly improved and we can hardly imagine an era when infections and whooping cough could only be treated with rest and prayer. Finally, nature's domain lay closer then. San Francisco Bay's estuarine marshes had yet to be filled, and most of the chemicals now tainting them had not even been invented.

Mr. Rice's personality and personal development make fascinating subjects, but the milieu he evokes is even more absorbing. Our modern world is far more constrained than the era described by Rice; the hand of society is heavier and the burdens of circumstance are less severe. Such changes are hard to quantify, but Rice shows them clearly. It is in this that *A Heaven in the Eye* stands out—a delight to the mind and a treasure in the hand.

John R. Alden
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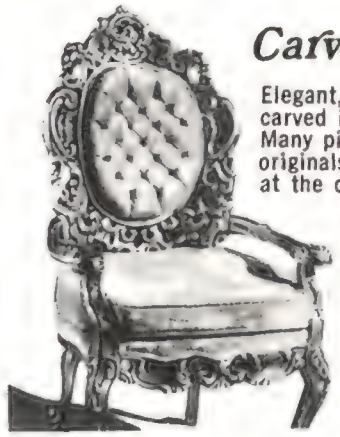

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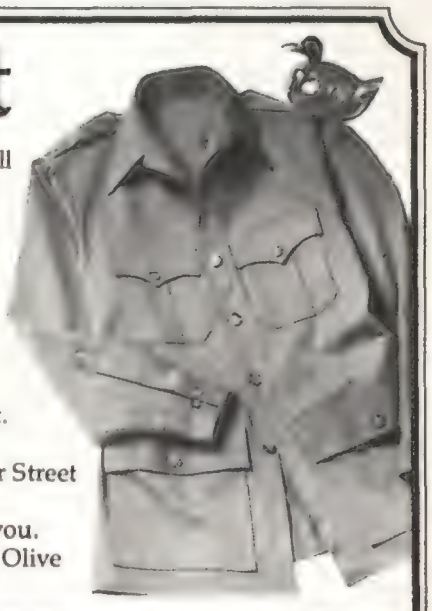

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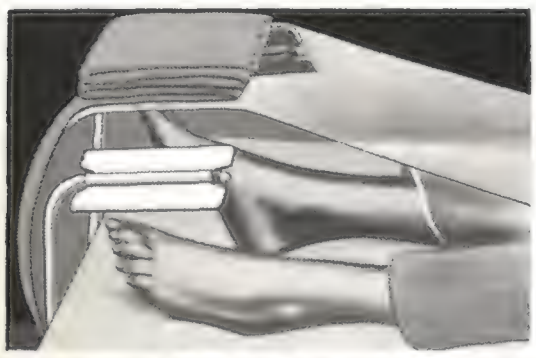

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Tropical Nature: Life and Death in the Rain Forests of Central and South America
Adrian Forsyth and Ken Miyata
Scribners, $16.95

A few years ago, at a Congressional committee meeting, a Congressman from the Pacific Northwest scoffed at a witness' alarm over the deforestation of the tropics. Why isn't the solution, he asked, simply to replant the areas cut, just as the timber companies in his home state do? If Ken Miyata and Adrian Forsyth's book, *Tropical Nature*, had been available then, it surely would have been much easier to make the good Congressman appreciate the unique nature of tropical rain forests.

An informed appreciation of nature is a rare quality today. To some, nature, and especially nature in the lowland tropical forests of Central and South America that this book describes, is filled with unseen dangers and dark foreboding, or at best with vexatious and bothersome creatures better avoided. Others seem unable to see nature without imputing to it human qualities and judgments. Still others view nature as evidence of the miraculous hand of a supernatural Creator.

To these young authors, tropical nature is, indeed, nearly miraculous and sometimes dangerous, but above all else an endless source of fascination and intellectual challenge. Written by two biologists about the richest biological treasure on Earth, this book need not deter nonscientists, for it is to them that it is directed. Indeed, it invites an appreciation of biology as few other books do, and does so with extraordinary grace and humor.

The workings of a biological system as intricate and complex as a tropical rain forest can hardly be described in a book this brief, yet in a series of short chapters the authors capture the essence of many principles that govern life in the tropics. They start, literally, on the ground floor, explaining why rain forest soils, despite the extraordinarily lush vegetation they seem to support, generally are unable to sustain silviculture or agriculture once the native forests are cut down. The reason, it seems, is that in the rain forest nutrients rarely accumulate in the soil, but instead are locked up in the living vegetation of the forest itself. When the vegetation is cleared, the soil that remains is nutrient poor, easily eroded, and often capable of "baking" hard like a clay pot.

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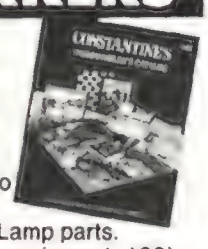

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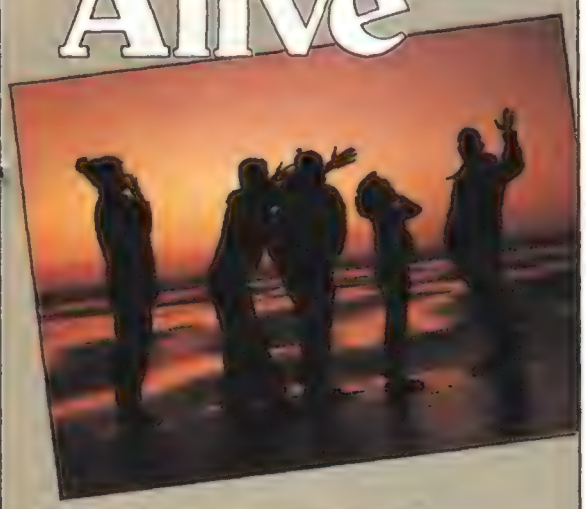

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From the forest floor we quickly climb to the canopy above, witnessing along the way one of the most extraordinary and, for this reviewer, least expected, struggles for survival. This struggle pits the forest's trees against the myriad of tropical vines and woody lianas that use the trees' structural support for access to that most precious rain-forest commodity, sunlight. Each competitor utilizes a rich array of devices to reward itself and frustrate the other. For those accustomed to thinking of the struggle for survival as one principally pitting animal predators against their animal prey, this chapter will open a whole new world.

Animals get their share of attention. Not all are ones we think of as tropical. A chapter on migratory birds argues that many of "our" local songbirds are in fact tropical birds that migrate to take advantage of the bounteous insect food supply of temperate summers. When their winter habitats in the tropics have been felled, silence will mark our spring.

Other creatures may be less appealing. A chapter entitled "Jerry's Maggot" focuses on a large bot fly whose larval "maggot" stage develops within the flesh of Jerry, a remarkably tolerant graduate student. This large and noisy fly has devised a remarkable way of getting her offspring to their unsuspecting hosts by way of mosquitoes. How such a strategy for survival could have evolved through the pressures of natural selection is one of the mysteries this book seeks to unlock.

Two tragedies mark the book. The first is that one of its authors, Ken Miyata, drowned in the rapids of the Bighorn River before the book was published. The other is that the tropical forests about which he and Adrian Forsyth have written are themselves in mortal danger. The deforestation of the tropical rain forests has accelerated dramatically in the past two decades as new technology and expanding population press the forest frontier ever inward (*Smithsonian horizons*, December 1984). Except in its final chapter, this book is not about the impending death of the rain forests. It is instead about their remarkable life. In telling that story so evocatively and entertainingly the authors are likely to enlist many in the effort to save this great resource.

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Additional reading

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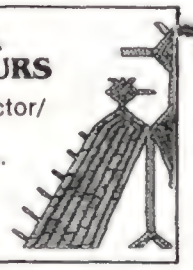

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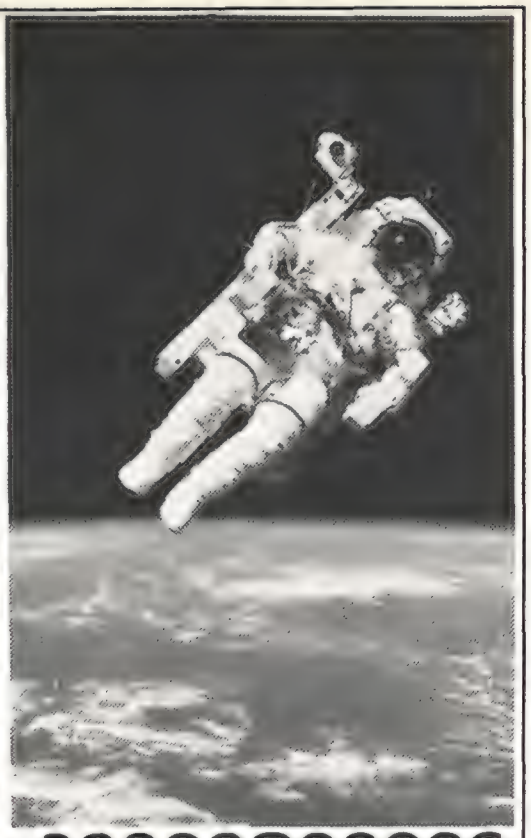

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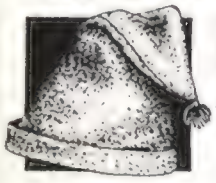

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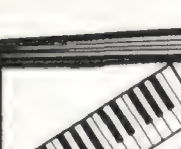

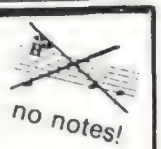

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In its last special TV program for this fall/winter season, *Smithsonian World* takes the viewer out into the field to see experts at work. Among those visited in "A Desk in the Jungle," airing on local PBS stations on January 9 at 8 P.M., are three Smithsonian marine biologists who descend 2,000 feet in a tiny submersible to study marine life, and a physical anthropologist who does research on Howler monkeys in Panama. Secretary Emeritus of the Smithsonian Institution, S. Dillon Ripley, an ornithologist, is also interviewed about his lifetime of research throughout the world.

Special January exhibits and events

Hirshhorn Museum & Sculpture Garden
The Hirshhorn Museum Free Film Series (begins January 26) Documentaries on artists, cartoons and experimental films. For full schedule, call 357-2700.

National Museum of African Art
Praise Poems: The Katherine White Collection (through February 24, 1985) Figural sculptures and masks.
Images of Women in African Art (February 7; 7 P.M.; Museum Auditorium) Lecture by Frieda High-Wasikhongo.

National Museum of American Art
Sharing Traditions: Five Black Artists in Nineteenth-Century America (January 15-April 7) Includes work by Joshua Johnson and Edmonia Lewis.

Renwick Gallery
Fanfare (January 25-July 21) Thirty fans from 18th to 20th centuries.

Cooper-Hewitt Museum (New York)
Embellished Calendars: An Illustrated History (through February 24).

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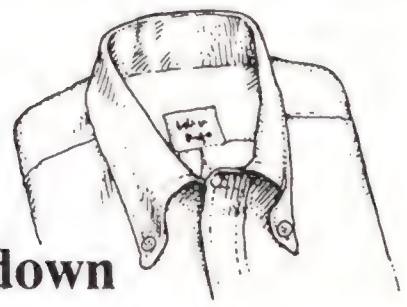

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European Illustration: 1974-1984 (through February 3).

National Air and Space Museum
Mission Control from Mercury to Shuttle (January 31; 8 P.M.) Christopher C. Kraft jr. gives insider's look.
More Wings of the Weird and Wonderful (January 10; 7:30 P.M.) Capt. Eric M. Brown discusses his flying adventures.

National Museum of Natural History
Views of a Vanishing Frontier (January 4-March 31) See *Highlights continued.*

National Portrait Gallery
Indian Peace Medals in American History (January 18-July 15) First exhibition of all examples from 1792 to 1884.

Freer Gallery of Art
Japanese Calligraphy (through April 30).

Musical Weekend in April

The 13th Musical Weekend, April 26-28, will open with the traditional bagpipe salute and dinner in the historic Smithsonian castle. Participants will hear Pinchas Zuckerman performing with the National Symphony Orchestra at the Kennedy Center for the Performing Arts. A reception will follow. Saturday, a demonstration of instruments in NMAH's collection will be followed by a Potomac boat ride and picnic. Other highlights will be tea and music at the British Embassy and a champagne breakfast at the National Zoo. For reservations write Musical Weekend, Room 4124 NMAH, Smithsonian, Washington, D.C. 20560.

Exhibition catalogs

Catalogs available at this time include:
Views of a Vanishing Frontier (paper, $14.95)
Chicago Furniture (paper, $25)
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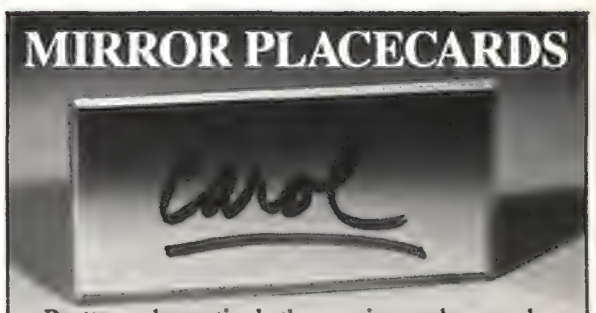

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That's Jazz (January 8-26) Program for young audiences in Discovery Theater; call for details.
The Smith Sisters Sing Folk Music in the Sky Theater (January 11; 7 P.M.).
Kenny Burrell in Concert (January 13; 7:30 P.M.) Jazz guitarist.
Beasties and the Mail (January 22; 7 P.M.) How animals have helped deliver mail throughout history; call for details.
Lou: The Remarkable Miss Alcott (January 25, 26; 7:30 P.M.) Actress Gayle Stahlhuth in one-woman show.

Smithsonian Institution Traveling Exhibition Service

SITES circulates exhibitions to hundreds of cities outside Washington. To sponsor a show in your community, write SITES, Smithsonian, Washington, D.C. 20560. Here are some January exhibitions:
Shreveport, Louisiana (January 19-February 24) *The Biblical Paintings of J. James Tissot*, R. W. Norton Art Gallery.
Worcester, Massachusetts (January 19-February 17) *America's Space Truck*, Worcester Science Center.
Columbus, Ohio (January 12-February 24) *Portraits in Black: Outstanding Americans of Negro Origin*, Afro-American Museum.

Smithsonian on the air

Radio Smithsonian: features on this weekly half-hour program include the evolution of 150 years of furniture design.
Smithsonian Galaxy: short radio features.
Here at the Smithsonian . . .: two-minute TV features look at entertainment memorabilia and X-ray photos of the universe.
Smithsonian World: "A Desk in the Jungle," January 9, 8 P.M., on PBS stations.

To find out what stations in your area carry these radio and TV programs, write: Office of Telecommunications, MNH Room C222B, Washington, D.C. 20560.

Membership benefits when visiting the Smithsonian

A cordial welcome is yours at the Associates' Reception Desk in the castle, the original Smithsonian Institution building, from 10 A.M. to 4 P.M. daily. You'll receive special orientation materials in an attractive reusable tote bag as well as all the details of your other benefits.

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Encountering the Indians

A German prince and Swiss artist explored our frontier in the 1830s; their legacy is on view at NMNH

In the early 19th century, many Europeans set out to explore new and exotic lands in what is now called "The Second Great Age of Discovery." At about the same time that Charles Darwin undertook his epic voyage aboard the *Beagle*, an aristocratic German naturalist accompanied by a Swiss artist came here to explore the North American frontier.

From 1832 to 1834, Prince Maximilian of Wied and Karl Bodmer traveled extensively across the Ohio frontier to the wilderness of the Upper Missouri River, where they befriended many Indians, especially among the Mandan and Hidatsa. As they moved, Bodmer painted and sketched tirelessly.

To commemorate the 150th anniversary of this expedition, the Joslyn Art Museum in Omaha organized "Views of a Vanishing Frontier," which includes Maximilian's diaries, more than 100 of Bodmer's watercolors and sketches, and related ethnographic and historical materials. The show, which has already visited Omaha, Fort Worth and San Francisco, will be on view at the National Museum of Natural History from January 4 through March 31.

Constance Bond

Hidatsa warrior, Two Ravens, led his village's Dog Society.

Quills, paint, beads and hair are used on leggings from Upper Missouri.

Clothes and ornaments of Hidatsa chief indicate trade with the Americans.

Bear entrails adorn the lance of Pitaptapiu, a young Assiniboin man.

Mehkskehme-Sukahs (Iron Shirt) greeted travelers at Ft. McKenzie.

Three war "coups" are shown here, on the back of hide shirt from Upper Missouri.

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Domestic Study Tours

Savannah and Charleston March 23-30 or March 31-April 7: Enjoy warm Southern hospitality on a tour of historic homes, inland gardens and nearby plantations.

Okefenokee Swamp March 30-April 6 or April 6-13: A serene canoe trip through this unique wildlife refuge.

Arizona in Spring April 9-17 or April 11-19: From the Arizona-Sonoran Desert to the Chiricahua Mountains, see cacti in bloom, meet researchers in the field and attend a local Indian fiesta.

Civil War May 1-10: Trace the eastern campaign following the routes of Stonewall Jackson, Grant and Lee. Visit historic homes, towns and battlefields.

Chesapeake Bay Cruise May 18-25: Enjoy fresh crabs and oysters aboard the elegant yacht *Nantucket Clipper*, while learning about the bay's history. Cruise to such charming 18th-century towns as Annapolis, St. Michaels and Williamsburg.

Alaska June 15-25: Board the *Majestic Alaska Explorer* for a breathtaking cruise from Seattle to Ketchikan through Alaska's famed Inside Passage. Stop at historic ports of call to observe local Indian cultures; see killer whales and the turquoise water of Glacier Bay.

Coming in June: Architectural history of Chicago; Vermont's historic villages.

Grand Canyon July 5-15: Raft with expert boatmen through magnificent landscape. Camp beside the river, see Indian petroglyphs, learn about wildlife, history.

Waterton-Glacier International Peace Park July 16-27 or August 13-24: Hike through spectacular alpine scenery.

Journey on the Green River July 19-29: Experience the thrill of white water and the beauty of Utah's magnificent Desolation and Gray Canyons in your own Sportyak.

Crow Canyon Archaeology August 11-18: Get hands-on experience as you join archaeologists near Mesa Verde, Colorado, to participate in a dig at an ancient Indian site.

Delta Queen September 6-14: Board this historic steamboat for an unforgettable cruise on the upper Mississippi.

Washington "Anytime" Weekend: Plan a winter weekend to visit your choice of Smithsonian museums. Package includes two nights at Loews L'Enfant Plaza or the Hyatt Regency, meals and exclusive tour of Smithsonian castle. Application and payment must be received at least ten days prior to arrival.

Foreign Study Tours

People's Republic of China, 1985: Exclusive tours to a variety of destinations are led by a Sinologist and include intensive pretour briefing.

Mexico from January through March: Seven adventure tours in the company of archaeologists and anthropologists.

Indian Wildlife Safari January 25-February 21: Observe rare species of birds and animals in exotic India and southern Nepal.

A Hike in New Zealand February 6-22: Discover wild flowers, crystalline lakes and snow-capped peaks on the Milford Track.

New Zealand February 6-23: Relish glorious scenery on this in-depth tour with talks on natural history, the Maori and Parliament. Includes a family visit.

Cruising the South Pacific February 23-March 10: At last, a Smithsonian cruise to enjoy the traditions, history and romance of Polynesia.

Indonesia March 10-31: Cruise beyond the ordinary to the islands of the Java Sea. Study natural history, observe local customs and traditional rituals.

Kyoto Seminar March 15-31: Live Japanese-style. Field trips complement lectures on art, history, religion and language.

Countryside Tours from April through September: Choice of eight two-week residential programs in England, Austria, Switzerland and France. Unpack your bags, relax, meet with local people while enjoying lectures, field trips, museums.

Canals and Old Masters April 10-24: Art museums, historic tours and spring flowers highlight four days in Amsterdam. Then sail by riverboat to explore medieval ports.

Paris and Provinces April 20-May 5: Six days in Paris with walking tours, special seminars at the Louvre, followed by a choice of travel to Provence or Burgundy.

Ecuador and the Galápagos Islands May 11-24: After visiting Quito and the Andean countryside, board the *Santa Cruz* for a study voyage to Darwin's famed islands.

Russia May 12-28: Leningrad, Moscow and Tallinn. See the Hermitage, Kremlin and other fabulous museums, palaces and landmarks. Visit schools, factories, clinics and enjoy the best of Russian theater.

Irish Walk May 14-25 or September 18-29: Hike low, leisurely trails, with overnights at castles and charming hotels.

Danube Cruise May 23-June 9: Explore magnificent castles, cathedrals and palaces on this historic route from Bucharest to Vienna via chartered ship.

Wild Highlands of Scotland May 30-June 17: Based in a castle, visit offshore islands, lochs, moors and glens.

Seminar in Florence May 31-June 16: Study the Florentine Renaissance while living in a 15th-century villa.

Coming in July: European Waterways cruise from London to Copenhagen.

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Animal Communication:
Classic Studies and New Discoveries
March 24-29, 1985
Join scientists at the Smithsonian's National Zoological Park for an in-depth look at the fascinating ways in which animals communicate through camouflage, armament, subtle scents and brilliant visual displays. Led by Zoo Director Dr. Michael H. Robinson and other eminent animal behaviorists, the seminar features lectures and tours at the Zoo and field trips to both the Zoo's Conservation and Research Center, a breeding facility for exotic animals at Front Royal, Virginia, in the beautiful Blue Ridge Mountains, and the National Aquarium in Baltimore.

American Masterpieces:
Three Centuries of Antique Furniture
March 24-29, 1985
Explore the dazzling collections of American antique furniture at the Smithsonian's Museum of American History, the Diplomatic Reception Rooms at the State Department, and Delaware's renowned Winterthur Museum with Oscar P. Fitzgerald, author of the acclaimed *Three Centuries of American Antique Furniture*, and antiques expert William Stahl of Sotheby's. This intensive course will highlight a wide range of historic styles and provide insight on authenticity, care, conservation and current market trends.

Watch this column for upcoming seminars on **Aircraft Restoration Workshops with Smithsonian Craftsmen**, May 19-23, and **Fine Ceramics of the Ming and Qing Dynasties**, June 2-7. Smithsonian Seminars in Washington are intended to provide enjoyable educational opportunities that further your involvement with the Smithsonian. All programs include classes and tours, welcoming reception, daily breakfast with fellow Associates and a gala farewell luncheon. Hotel is optional.

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By Rudolph Chelminski

'What are we having for little lunch?'

"Papa, what are we having for little lunch?"

There it was again, a picture-perfect example of the grammatical gibberish that has been driving me to distraction. For years now, the public guardians of French linguistic virginity have been railing against the tidal wave of *Franglais* that has been invading their culture (everything from *le penalty* and *le footing* to *le software* and *le weekend*—which the more fanatically inclined are now Gallicizing into *le ouiquende*—and, of course, the inevitable *hambourg-air*). Little do they realize, or care, that there is another side to the coin. My little girl's little lunch was a splendid demonstration of it.

She was speaking "Frenglish" to me. I hope that Jack Lang, France's fire-eating Socialist minister of culture, will be happy to know that what he describes as cultural imperialism works both ways. What Stephane was inquiring about was the menu for *petit déjeuner*, which is the way the French say breakfast. Little lunch. Kids are smarter than I realized, I realized: if they happen to be brought up in a bilingual situation (I am employed as a cancan inspector at the *Folies Bergères*, and my wife, also American, is an ear-lobe model for Chanel Number 4), they naturally fall into the habit of migrating directly from one language to the other without paying the least attention to the grammatical stop signs that adults have erected at the frontiers between them. It seems to be an absolute rule: when they can't think of the word or the proper grammatical construction in one language, they simply borrow from the other one and translate literally. Hence Stephane's little lunch for something she used to call "breffix" before she started "attenting" a French school.

And here comes the second absolute rule of bilingualism: it is always the language of the school and the little friends that wins. If we lived in Tonga the kids would be speaking Polynesian, I guess, and if it were Baltimore, they'd pick up Ballimer, heaven forfend. My wife and I have an iron rule of speaking only American at home, but the kids (aged eight and nine) jabber back at us in French unless we resort to threats of corporal violence or TV deprivation. It is then, when they are in the American mode, that the Frenglish comes roaring at us.

"I have a blue."

"What did you said?"

"I got a big blue when I falled off the *balançoire*."

Is that all clear now?

This enlightening dialogue, carried on the other day between Stephane and Romy, succinctly described the travails encountered in any kid's normal working day, and my own in trying to teach them to distinguish between one language and the other: she got a bruise when she fell from the swing. Needless to say Franco-American children are very "fashed" (angry) when their mother "grondes" (scolds) them about Frenglish.

Weak and strong verbs are bedeviling for anyone who is not bathed in them 24 hours a day. "I goed," "I eated" and "I winned" are so frequent they hardly even elicit shrieks of parental dismay anymore. Occasionally, I am moved to chagrined admiration at the creation of a whole new class of verbal constructions, such as "You walk on'd it" and "It get outs like that." But the most consistent fomenters of Frenglish catastrophes are past participles and the simple, multipurpose French preposition *à*, which can mean "at," "to" or "in," depending on how you use it. How can you explain to a kid that English likes to complicate things, and that we are going *to* England to eat *at* Freddy's house *in* London? I'll tell you: you can't. Without *à*, they don't know where they're at.

As for the past participle, it is just supposed to be there, because that is what they have learned, and so the world is constructed that way. How can you explain that the magic addition of "did" in the verbal construction eliminates its need in English, as in did you go and did you see? Can't do that, either: kids will go on saying it their way, because it's more logical, dammit. That's why Stephane asked me: "Did you went at America?"

When I leave them to their own devices and simply observe, I realize that what they speak to each other is neither *Franglais* (French colonized by English) nor Frenglish (English colonized by French), but a mix of the two languages that is akin to French-Canadian. But in their case, the hybrid is further complicated by a dash of leftover baby talk.

"Babou, tu n'as pas flushé le toolie!" my boy recently exclaimed to his sister.

That may not be clear to all of you, but I'd be willing to bet that it is to every *maman* in Québec. Now if I could only get the kids to stop correcting my French in front of company. . . .

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